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PRINCIPLES
OF
ORGANIC LIFE.

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PRINCIPLES OF ORGANIC LIFE,

SHOWING THAT THE GASES ARE OF EQUAL IMPORTANCE WITH THE
SOLIDS AND FLUIDS IN THE LAWS WHICH REGULATE THE
PROGRESS OF MATTER FROM THE LOWEST INORGANIC
TO THE HIGHEST ORGANIC CONDITIONS.

BY

BENJAMIN RIDGE, M.D., F.R.C.S.E., &c.

AUTHOR OF 'A SYSTEM OF GLOSSOLOGY, OR THE ADDITIONAL MEANS OF
DIAGNOSIS OF DISEASE TO BE DERIVED FROM INDICATIONS AND APPEARANCES OF
THE TONGUE'; 'PHYSIOLOGY OF THE UTERUS, PLACENTA, AND FETUS, WITH OBSERVATIONS
ON THE MEMBRANA MECONII AND RETE VASCULARE, NEWLY-DISCOVERED STRUCTURES EXISTING
IN THE FETUS AND YOUNG OF MAN AND ANIMALS'; 'AN INQUIRY ON THE SUBJECT OF
VACCINATION'; 'HEALTH AND DISEASE, THEIR LAWS, WITH PLAIN PRACTICAL PRESCRIPTIONS
FOR THE PEOPLE'; 'OURSELVES, OUR FOOD, AND OUR PHYSIC'; ETC.



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PREFACE

TO

THE SECOND EDITION.



It has long been admitted that our present Physiology is not quite satisfactory, and that it cannot account for myriads of the phenomena of life we constantly see around us.

In May, 1865, I began a series of Letters, bearing on this subject, for 'The Medical Circular and Gazette.' Their dates will show the regularity of their appearance.

In 1868 I corrected them for the present book, which, with some additional matter, I published anonymously, merely asserting my own views upon certain principles of Organic Life. My Publisher now advises me to write a new Preface for a second issue, acknowledging at the same time the Authorship of the Book, and adding any fresh matter I may have since acquired.

The omissions I have to bring against the Science of Physiology are, that it has not taken sufficient notice of the many valuable products which are made

by the GASES in the body, and has not sufficiently distinguished the two great principles of matter—viz., the ORGANIC and the INORGANIC.

When H. M. S. *Challenger* went on her Ocean Survey Expedition, at the latter end of 1872, her Staff were directed to ascertain ‘the nature and volume of the GASES contained in the water at all depths, and the amount and nature of their salts and Organic matter,’ presuming thereby that the greatest mass was of an Inorganic character.

It had been supposed that Animal Life could not exist at enormous sea-depths, but this has been proved by the scientific officers of the *Challenger* to be erroneous. Animal organisms were brought up from great depths, but as they neared the surface, the Gases within them, naturally expanding on the removal of the great pressure under which they existed, distorted their forms even to bursting.

This clearly shows that the lowest form of life contains Gases, which must act in their bodies as resisting forces to the pressure to which they are subjected, whether they live in the air or under the water.

If such is the fact, there cannot be a doubt that all living organisms must generate Gases, and that these Gases must be of a varied and distinctive character: furthermore, that whenever and wherever they meet, some fresh combinations necessarily result.

As Chemistry has shown this to be the case, there is every reason to believe that they may be great factors

of vast amounts of Inorganic elements, both solid and fluid. Although it is not actually admitted, yet the study of all primeval matter, whether in the solids, as the 'Blastema,' or in the liquid form, as 'Plasma,' leads to the conclusion that the Inorganic elements play the first and greatest part.

The rapid disintegration and resolution, conversion and reconstruction, of their containing elements acting constantly upon each other, produce certain properties of a higher character, which we recognise as Organic.

The highest authorities clearly demonstrate that the chemical proportions of the Inorganic and Organic elements in the body are as 90 to 95 per cent. of the former, to 5 to 10 per cent. of the latter, or even a larger percentage of the Inorganic.

It is clear that Organic elements would not and could not exist without the presence of the Inorganic, and it is in these latter that the Gases play so wonderful and so conspicuous a part, and in all living organisms offer a certain resistance to the atmospheric pressure, or they could not grow.

These come under the denomination of 'the elastic forces,' and my great object is to call attention to their wonderful vital actions and powers within the body.

For instance, Hydrogen is evolved from the fæces in the colon, and passing, by Osmose, through its coats, combines with the Oxygen freely circulating within and throughout the body, which by liquefaction produces an Inorganic fluid, which serves as a lubricating

element. Carbonic Acid and Steam are also formed, which condense. Any excess of Oxygen is removed by more evolution of Hydrogen, yet still leaving the Carbon and Hydrogen in sufficient quantities to form Hydrocarbon or Fat, which contains a soft unctuous fluid, from whence we get a further supply of the Inorganic Menstruum, for use between the fasciæ of muscles, and by and through the muscles themselves. Hence Fat is the great oil-can of the body.

If 30,000 to 40,000 cubic inches of Oxygen are daily absorbed by the lungs, which authority tells us is the case, what must be the number of cubic inches of Oxygen taken into the alimentary canal during the process of eating and drinking, and what the number that is absorbed into the system through simple atmospheric pressure? I believe that the quantity absorbed by the lungs is only sufficient to keep up their pabulum or vital action, and to oxidise the blood in them, and that a far larger quantity is actually needed by the blood itself in its progress through the system for its necessary and perfect oxidation: therefore the blood-current must get Oxygen from other sources than from the limited supply of it that is taken into the lungs.

Oxygen is wanted everywhere, except in the colon. If the Oxygen of the air penetrates the skin of fishes, which it readily does, it acts upon the subcutaneous adipose tissue by the oxidation of their fat, and phosphorescence results, which is entirely arrested by their immersion in carbonic acid, fresh water, alcohol, or

other non-oxygenated solutions. We no doubt get slow oxidation of our fatty tissues, and are always making the heating Gases within us. Carbonic oxide and acid, for instance, are converted by heat into soda, which is largely secreted in the salivary glands. Thus we have a large amount of alkali in the system, such as potass and soda, as well as almost every form of acid. We ought not then to wonder at electric actions taking place, producing frequent specific changes in all animal combinations. If these occur in our material formations, what must be the rapidity of the distinctively characteristic psychological actions produced by them in the brain, in the form of thought, &c.?

The growth of vegetation is ascribed to its sap rising, by molecular attraction and constant protoplasmic formation; but it can readily be inferred that it must be greatly assisted by the force of expansion of its containing Gases, which are increased by fresh union with others in their progress, by absorption. We see the result of their union in every form—some condensed to hardness, others remaining soft or pulpy.

It is a natural law that the Inorganic elements should be largely in excess of the Organic; their deficiencies are fully exemplified in fevers. (See p. 56.) If the Organic elements of the body were equally consumed with the Inorganic during fevers, no person could ever recover from them.

In fevers the Gases cease to form perfect combinations in the body, and it therefore becomes hot, parched,

and dry. No new fluid Inorganic elements are made under such conditions, and those which are present in the system are quickly converted into Gases, which are lost by evaporation. The Inorganic element known as the Fat becomes converted into a fluid state, and evaporates also in a gaseous form.

The Fluids in the tissues between the fasciæ of muscles, and those between every fibre of every muscle, evaporate in the same manner. The soft Solids next lose their Inorganic fluid elements, and so on, until every part feels the loss of lubricating elements, and the sufferer becomes greatly reduced in weight. He has not lost Organic elements, such as bone or cartilage, or muscle or sinew, or fibrin of blood.

It is well known that no amount of fluid elements seems to satiate thirst in fever, or has any apparent influence to assuage or stop the drought that exists. During the one, two, or three weeks of fever, the patient will become reduced to a mere mass of Organic structure. By some wise law the fever abates, and this is nothing more nor less than the natural Gases of the body again combining, the hydrogens with the oxygen, and thus producing fluid Inorganic elements once more.

Thus we see the bodily alembic itself making its own fluid Inorganic elements, and restoring its own equilibrium.

Taking this view of the subject, the Gases seem to be the chief manufacturers and factors of the Inorganic fluid elements of the body. That all these are first

supplied by the blood, and that the blood takes every excess of them back again (which is the prevailing belief), is a dogma which will for ever stop the progress of enlightened Physiology. Dr. Parkes, in his *Gulstonian Lectures on Pyrexia*, says: 'It is now known that in varying degrees there is a constant transit of fluid from the blood into the alimentary canal, and as rapid reabsorption. The amount thus poured out and absorbed in twenty-four hours is almost incredible, and of itself constitutes a secondary or intermediate circulation never dreamt of by Harvey.' I believe this theory to be open to many and grave objections.

The greater portion of the Inorganic fluid elements has been evaporated during fever, while the blood itself has been robbed of the greater part of its Inorganic Menstruum, and is only a labouring mass of ill-diluted fibrin, urged by excessive action of the heart, at 100 to 150 or more pulsations per minute, with excess of friction throughout all the vessels.

Again, Dr. Parkes says: 'The amount of gastric juice alone passing into the stomach in a day, and then reabsorbed, amounted, in the case lately examined by Grunewald, to nearly twenty-three imperial pints. If we put it at twelve pints, we shall certainly be within the mark.' 'The pancreas, according to Virager, furnishes twelve-and-a-half pints in twenty-four hours, while the salivary glands pour out at least three pints in the same time. The amount of bile is probably over two pints. The amount given out by the intestinal

mucous membrane cannot be guessed at, but must be enormous. Altogether the amount of fluid effused into the alimentary canal in twenty-four hours amounts to much more than the whole amount of blood in the body ; in other words, *every portion of the blood may, and probably does, pass several times into the alimentary canal in twenty-four hours.* The effect of this continual out-pouring is supposed to be to aid metamorphosis ; the same substance, more or less changed, *seems* to be thrown out and reabsorbed, until it be adapted for the repair of tissue, or becomes effete.'

It is very clear, from the above statement, that some great unknown phenomena are guessed at, then asserted as '*now known*,' and believed in, as a matter of course ; for Dr. Murchison says, in his Lectures on Dropsy (*British Medical Journal*, 11th May, 1872): 'That everything is exhaled from the blood and everything absorbed into it, and that Dropsy is the excess of exhalation of the blood over absorption ; yet the fluid of Dropsy is not liquor sanguinis, but resembles the serum of the blood, as always containing much albumen. Watery exhalations from the mucous or serous surfaces and into the tissues are reabsorbed by the small veins—ergo, they were exhaled from the blood. When the veins do not absorb this, as it is given out, because they are too full already, absorption is diminished, and this is Dropsy.' Again, Dr. Murchison says : 'A similar circulation goes on between the blood and the various serous surfaces,—a constant serous exhalation

from the blood, which is reabsorbed as fast as it is thrown out.'

First of all, then, as was said of the fluid supply to the mucous membranes from the blood being enormous, another enormous supply from the blood to the serous membranes also takes place.

In answer to Dr. Parkes, I would ask, If all the blood of the body, with all its fibrin, passes several times in the twenty-four hours into the alimentary canal in order to be taken up again, how can those Organic portions of it have time to form the necessary salts in all glandular secretions, which are to be used again in the animal economy—also to supply Organic properties to thousands of places in the general fabric of the body? The blood, like all other Fluids, cannot get re-invigorated powers except from newly-formed Inorganic combinations, and then receives their welcome moisture or newly-made diluent in proportion to all other structures and parts requiring them.

Dr. Richardson, in one of his experiments, injected four pounds of water into the peritoneum of a dog, and in twelve hours the animal died, and not a drop of fluid was found in the peritoneum; 'it had all been taken up by the veins, and had caused death by diluting the blood.' There is no analogy in this case at all, for (according to Dr. Murchison) a human being can take up into the system ten or twenty times this quantity from the fluid of Dropsy. The experiment was to show that the four pounds of water were

absorbed, but I much question if the whole quantity got into the blood. It was inserted into a cavity unfitted to receive it, in the first place; and the first effect would be to cause peritonitis, followed by rapid bronchitis, with pneumonia and dyspnoea, and these inflammations as rapidly followed by feverish actions, whose heat would soon evaporate 90 per cent. of the fluid, and leave but a small portion to get into the blood at all: independently of which the cold fluid (for I presume the water was cold, as he did not say it was warm) would have a most paralysing effect on the whole nervous system of the animal.

That all secretions are made from the blood is evidently the belief of the Physiologists of the present day, for, in confirmation of what Drs. Parkes and Richardson say, ‘Lechmann made an opening into the pericardium of a healthy criminal, and found that the fluid, which ran from it in three-and-a-half minutes, amounted to nine-and-a-half fluid drachms, which is equivalent to 488 drachms, or above thirty pints, in twenty-four hours, and in health *this enormous quantity of fluid is immediately reabsorbed.*’ I shall refer to this curious experiment and inference thereon in another place. The mucons and serous secretions cannot be less than eighty pints a day. Then we have all the fluid secretions of the fasciæ of the muscles, and all the secretions of the interstitial fibres of which the muscles are composed, and whose name is legion, and cannot be less than 100 pints! What must it be in

dropsies? Then we have the fat in the body, whose amount cannot be calculated. All these put together are, of course, secretions to be made use of again in different forms. But then, how is the nervous system, both sentient and motor, with the entire brain, to be supplied with their proper elements? This great system must be constantly re-invigorated and supplied, as it undergoes a continuous course of waste. Our Physiologists assert that all reconstruction of parts is made from the blood alone: surely this cannot be, as it seems impossible.

We come now to the losses in the body by excretion. The urine excreted is from two to five pints daily, and the exhalant action of the body, by perspiration and evaporation, must be very large indeed. Leaving these out of the question, and also the supply to the nerves, we are supposed to get, according to our present belief, about 370 pints of fluid elements supplied daily by the blood, containing every variety of acid, alkali, and neutral salts. Independently of this, we have all the seminal secretions, and (during lactation of the female) all the milk. Does that also come from the blood? I cannot think so. Yet the whole amount of the blood in the body is, uniformly, only about fourteen pints, over 90 per cent. of which is Inorganic matter, and has a certain given circulation through the body, at so many times in the twenty-four hours. Now, if this obtains in the normal condition of health in each individual, what must be the extra call upon this vital fluid for repair in disease

and accidents—from a simple boil to the largest abscess, from a simple burn or scald to those great injuries we witness in their most dreadful proportions? Wounds of the smallest to the largest dimensions, by every form of cutting instruments and every form of laceration, and in their healing the immense drain upon the system, all have to be restored by the beneficent action of one current, which at the same time is to keep all the healthy parts still healthy, by no neglect of the recuperating process.

Drs. Parkes and Murchison are great authorities, and most physiologists admit their views on all these subjects. I may commit great heresy in doubting what they say, and what almost all men believe, but I am compelled to do so.

So important and so vital a current is the blood, so uniform in its chemico-vital constituents in health—its quantity always remaining at a normal standard whilst in health, and differing only from these states under various forms of disease—that the constant and enormous changes in it, as taught by Drs. Parkes and Murchison, and believed in by all the world, would continually upset the whole system, and be in opposition to all the laws of the animal economy.

If we approach the subject of natural reconstruction, our first inquiry should be, upon what laws and principles primary constructions were made, and took form and shape, before even the blood itself comes upon the scene? When its presence is fully demonstrated, then to ask ourselves how it itself was

first formed and afterwards renewed, and what are its real uses, and if it does or can by any possibility do what it is now believed to do, or is it that vital current of itself which Physiologists believe it to be? I am indebted to the chemists for their analysis of every secretion, every excretion, and every solid and fluid of the body, and upon their excellent information I rely, and only reason thereupon. I will simply take that of the Blood, as the very richest of all the secretions; and I find that water, albumen, serum, and fatty matter amount to about eight hundred and sixty in one thousand parts—the corpuscles of the blood to one hundred and thirty-one; but, then, these very corpuscles again contain two-thirds water, or, say, eighty-six parts, which, added to eight hundred and sixty, make nine hundred and forty-six parts of Inorganic matter out of one thousand, leaving only fifty-four of Organic elements, or a little over 5 per cent., of which forty-three are blood-corpuscles and eleven organic salts fibrin, &c.

As for the phosphates, in every form of the blood they are really inconsiderable—scarcely a half to three-quarters of the unit in every one thousand parts. Now this is worth a little consideration, for on the human germ passing into its proper receptacle, the first act seems to be nothing but a natural endeavour to make a certain amount of Inorganic matter to envelope and take care of it, and to increase this mass in such a manner as to make a medium for its growth. It has to pass through.

many changes before it reaches its true mammalian character, at each of which it gradually gets an increased percentage of Organic elements, and which I believe to be the produce of the chemico-vital changes of Inorganic matter by greater development. The first Inorganic elements, therefore, would only supply a formative mass, and afterwards make, or construct as factors, the Organic elements at each stage of its growth. If it was not for this natural guard of the laws of each stage, everything would be hopelessly confounded. As, then, the Inorganic elements have so large a share in the formation and growth of all primeval life, from the first ova to the perfection of the genus to which it belongs, the same phenomena must be continued afterwards as natural laws, which I will endeavour to illustrate.

Instead, therefore, of the Blood making all these wonderful phenomena in the system as an Organic element, and yet not containing many things needful to the system, it is really indebted to the Inorganic elements, not only for its own first formation, but afterwards to the keeping up of its volume and power. Even our analysts say that 'hosts of new chemical compounds are formed in hosts of other secretions of the body which are not known in the blood.' The question arises, is it possible that 14 to 20 lbs. of blood, however quickly it may be made, and however often it may pass through the whole body in twenty-four hours, can supply 200 to 300 lbs. of Inorganic

elements, by first evolving and then again reabsorbing them, as has been recorded? 'There are strong proofs that it does not, and, in fact, that it cannot do this. In order to clear up this obscure point, it is the duty of the Physiologist to inquire how material elements first come together to form primary nuclei, which shall afterwards develop many organisations, and produce hereafter a living being. Also, that up to a given period of these progressive formations there is no blood in existence at all, and the very smallest percentage of Organic matter present. If such is the case, the principal, if not the whole, duty of primary formation devolves upon the Inorganic elements alone. When, therefore, any part of the body or its organs becomes damaged by disease, or by outward forces and accidents, are we not justified in believing that the same natural laws obtain in repairing them as occur in their first formation? Being compelled to admit restoring powers by some wonderful phenomena, but having no notion how all the various elements of every character come together to do this, Physiologists have one and all fixed upon the Blood, and assigned to it duties which it cannot do, and in which it had played no part during their first formation.

The combining powers for healing must vary: those, for instance, which have to restore the cellular tissue differ from those which restore the *entis-vera*; and these, again, differ from those which restore the

bark-skin only, and so on, to every different structure or part of the body.

There must be a great variety of elements, in the first place, to form any structure, however small, and one germ alone for this purpose comprehends many amalgamations and transformations. When many germs are required to effect the end in view, they must coalesce, intermix, and aid and assist each other in a rapid and marvellous manner; for in these actions one may take excess of elements, and so be able to give them off to another, the lesser then getting the required proportions.

If this, again, absorbs more than sufficient for its perfecting process, it again imparts its surplus to, or in fact will be robbed of its excesses by, a neighbour: so that, in great or little matters—both in first formations before the maturity of the animal is complete, or in reconstruction from injuries after its

full perfection—the same laws must regulate the principles of Organic Life. I will endeavour to illustrate my meaning by a few diagrams:—

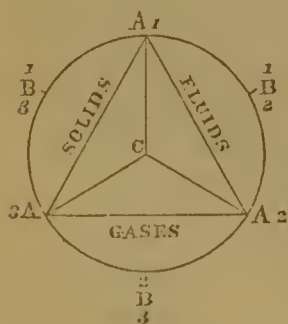


FIG. 1.

1st.—Whenever and wherever elements of any character, containing even similar or different properties, come into contact—whether they be Solids, Fluids, or Gases—evolution of Gases is a certain result. For better explanation, a

Solid and a *Fluid* meeting at A 1 (fig. 1), evolution of Gases takes place; the lighter radiate, and the heavier centralize. But as there is considerable pressure all around, the lighter are consequently forced downward, and surround the substances evolving them, as at B 1, B 1. These Gases always have given chemical characters, resulting from the sources from which they were derived, whilst at the same time a chemico-vital or electro-vital action ensues, producing caloric or heat; and thus carbon is evolved, which obeys the law of always gravitating to the centre, at C. The gases B 1, B 1 come down to a point of the circle opposite the centre C, and thus *one-third* of a cell is formed.

2nd.—Simultaneously an union takes place between a *Gas* and a *Fluid* at A 2, and a similar result is obtained—namely, Gases are generated, partaking of the character of the combining elements which their contact produced, and these radiate to B_2, B_2 , each side reaching again as far, and opposite to the point C, whilst carbon being generated as before, gravitates from this fresh union to the centre C. Thus two-thirds of a cell is formed.

3rd.—Again, with equal rapidity, and simultaneously, a *Gas* and a *Solid* meet together, by contact at A 3, with similar results, Gases being evolved as before, which radiate to B_3, B_3 , whilst carbon or heat is centralized again at C—and so the circle is perfected. The different Gases evolved from their three distinct

sources meet each other at their points of contact, combine and coalesce in endless proportions in the circle, for the object Nature has in view. Carbon produced from all these combinations is seen to centralize, from whence heat is evolved, and thus all these together work in harmony, in one continued and continuing circle.

In all these actions we can conceive the distinct formations or restorations of every part according to the laws of combination of elements for that part, and imagine them in their unity, and then in their entirety, to form an 'atom,' or a 'cell,' or a 'blastema.' Now these actions at first are entirely of an *Inorganic* character, and energetically progressive. They multiply indefinitely and constantly, according to the work to be done, whether as in a new and fresh formation for a new being, or in the repair or reconstruction of an old one. They may begin from the millionth part of an inch and in myriads, and then coalesce and furnish every part with first formations or elements of repair. It is clearly seen that the Gases are largely given off, and we are informed by Faraday of their wonderful powers of liquefaction, and of their entering into fresh combinations and formations, and taking the character in their unions of all such parts where these phenomena appear.

It is also worthy of note, that the Gases are seen to unite with both Solids and Fluids, and therefore show a preponderating influence and power over these two,

and over the whole cell. On the other hand, the Solids and Fluids only unite in one instance, whilst the Gases generated from the union, with every other substance in all their variety, meet and coalesce. They may meet in opposition as well as in harmony; if in the latter all goes on well; if in opposition, a thousand of the smaller ailments are due to them, which often deceive the physician into the belief of tendencies to organic lesion or functional disorders in the general secretions. Who has never had what is called '*The Wind*,' the common disturber of infants and many ailing adults of both sexes? Throughout all physiological works the Gases may be and are certainly mentioned as *incidences* but not as *POWERS*, as I wish to show them to be.

I refer to diagram No. 2, showing how the sides and parts of all these first cells get enlarged and spread:—

1. Solids.
2. Fluids.
3. Gases.
4. Union of fluids and solids.
5. „ solids and gases.
6. „ fluids and gases.
7. Concentric heat from union of 4, 5, 6.
8. Union of actions by metamorphoses of gases between fluids and solids and solids and gases.
9. Union of action by metamorphoses of gaseous products between fluids and solids and fluids and gases.

10. Union of action by metamorphoses of gases
between fluids and gases and solids and gases.

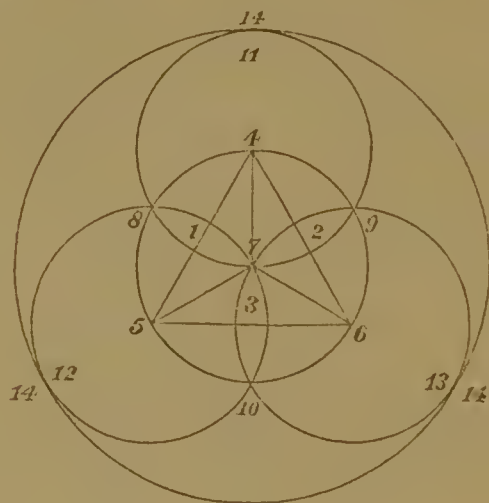


FIG. 2.

11, 12, 13. Radiation of heat from centre 7, again influencing general union, and producing
14, 14, 14. Electric actions from the whole, and uniting all eccentrically, and concentrically answering to nerve action, and forming also the true Endosmose and Exosmose.

Thus heat, the product of all first formations, acts by its own laws of expansion, and radiates to the surfaces when in excess.

Fig. 2 illustrates the advancing process going on in Fig. 1, with its single triangle of solids, fluids, and gases.

Fig. 3 shows further development, having six

triangles, and how one side of a cell may form the side of another, consequently growth, even in the smallest spaces where original construction or reconstruction has to be performed. All these six triangles are kept concentrically together, having powers of closing upon every centre, by which means we can more readily understand to what small cicatrices the largest wounds,

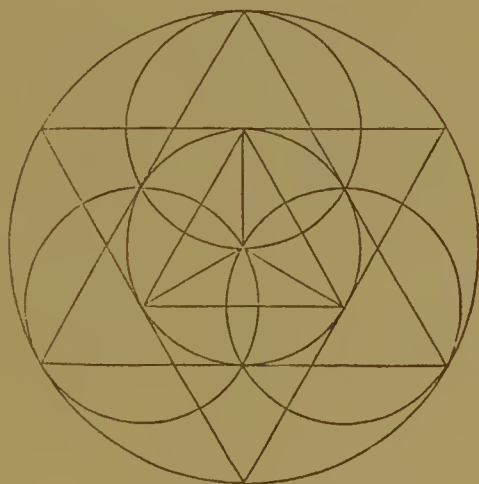


FIG. 3.

in their healing, are reduced in Nature's laboratory. We here see how many substances are required, which, by simply altering in degree or combination, shall produce everything required. These various elements, numerous as they are, baffle our laboratorial researches, into their characters as well as combinations, yet come together by laws of their own. The slightest alteration in their elements produces all that is required or

desired, whether for bones, muscles, tendons, fasciæ, cellular tissues, cutis-vera, and skin, all in their places at their proper times, and in due proportions, for the formation of every distinct structure.

The triangles in figs. 1, 2, and 3 only show an equivalent action in the combination of the Solids, Fluids, and Gases: but this cannot truly exist in Nature, because

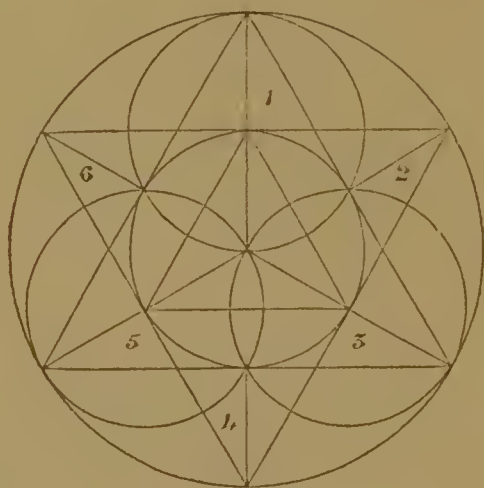


FIG. 4.

the proportion of elements must alter in a thousand ways constantly. Fig. 4 is therefore designed to illustrate this deviation, as in the isosceles triangles 1, 2, 3, 4, 5, 6, and the corresponding ones opposite to these numbers, where long and short sides meet in greater or lesser combinations, producing greater or lesser proportions of the radiating Gases, as well as greater or lesser degrees of carbon, which influences the caloric or heat

of the part. Furthermore, in all these unions of elements for structural purposes, as illustrated by triangles, it will be seen that *one side*, whether of the equilateral or the isosceles triangles, will form the basis of two triangles. The side, for instance, showing the *Solid* base shall have a double union with two Gases and two fluid sides. Again, a *Gas* base will show a double union with two solid and two fluid sides; and thirdly, a *Fluid* base, a double union with two solid and two gas sides, just as the case may be, for all natural requirements of structure, in addition to which they produce the varieties of colours and odours which we find throughout all created beings, whether in the beauty of the genus Homo, the plumage of birds, the varied coats of animals, the skins of reptiles and fishes; or throughout floral and vegetable nature, their varied colours, or in the presence or absence in them of the scent-matrix. (See pp. 53, 81, 96, 114.)

Fig. 5 is given merely to illustrate the interminable actions going on throughout the internal structure of the body, the absorption from without and the radiation from within in every form of Osmose. The points of the arrows outside the circle illustrate radiation; the feathers of the arrows outside show absorption.

Much was formerly written of the sources of heat in the body. I do not think that we need cast about in future for any such causes, when in every moment of our existence decay and decomposition is going on within us, and reconstruction taking place, always ac-

accompanied by a certain amount of heat or caloric. If we see the phenomenon of heat generated in the repair

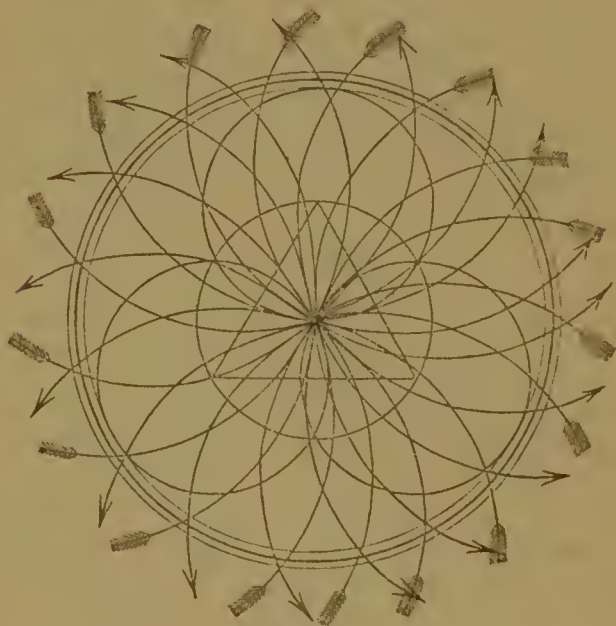


FIG. 5.

of the smallest destroyed structures, and consider the countless myriads of these actions always taking place (as illustrated by the diagrams), we cease to think of simple friction of muscle or blood and other circulations, or the digestive actions, and what they are as caloric or heat producers, in comparison with what I have described.

I showed these geometrical designs to a friend in September 1866, who was much struck by them, and forwarded to me the following extract from 'Chambers'

Cyclopædia' (1738), headed GEOMETRY: 'The Egyptians (Gale observes) used geometrical figures, not only to express the generations, mutations, and destruction of bodies, but the manner, attributes, &c. of the spirit of the universe, who, diffusing himself from the centre of his unity through infinite concentric circles, pervades all bodies and fills all space. But of all other figures, they most affected the *circle* and *triangle*—the first as being the most perfect, simple, and capacious of all figures, whence Hermes borrowed it to represent the Divine nature, defining God to be an intellectual circle or sphere, whose centre is everywhere and circumference nowhere.'

I was wonderfully pleased with this, and if we view natural 'generations,' 'mutations,' and 'destruction of bodies,' with reconstruction and repairs of damages to them, or even the keeping up of them in their integrity and healthy status, we may justly go to the 'Triangle' for union of elements, and to the 'Circle' for combination, fixing and uniting all parts without a point of distance or separation or vacuum anywhere, for in such natural actions no such thing can happen.

Histologists may try all their schemes to account for the structures of tissues in insects and plants, but if they have not considered the variety of elements which must come together by some natural laws for these ends, they have only vague ideas on the subjects, and must be for ever baffled. Nature accomplishes all her ends by wonderful and infinitely minute processes.

A single down of the moth's wing, shown by the microscope, and magnified to the size of a bird's feather an inch or two long, has had the same natural development as the largest feather that any bird produces.

I refer my reader to Fig. 1 of my diagram, as to what in my own mind must be the conditions to effect all these great ends. What subtle chemistry could analyse the wing of a moth, with its thousands of microscopic feathers? What subtle chemico-vital laws produce what we see? Because we cannot do the one, or understand the other, there is nothing left but conjecture in what manner it may be done. We can only reason from the analogy on what is the process of original growth, and infer that the same laws continue in the repair of diseased structure.

If such be the first formation of 'atoms,' 'cells,' or 'blastema,' similar processes may easily be conceived in the formation of the 'plasma' or 'protoplasms.'

The Fluids appear to be always in excess of the solid elements in the body, and the Inorganic elements, both solid and fluid, in excess of the Organic, in a ratio of 90 to 99 per cent. and many fractions even of the ultimate unit. What the percentage of the Gases is no one can tell, because of their evanescent character; but I find, again, from the reports of analysts, that they have found Carbon ranging to about 55 per cent.; Oxygen, 23 per cent.; Nitrogen, 14 per cent.; and Hydrogen, 8 per cent. in every 100 parts of everything they analyse.

Therefore we cannot for a moment admit that the Blood does all that it is said to do, for it seems to be indebted to everything else for its own vitality, both in quantity and substance. Unless the Physiologist has had a most extensive practice of Medicine and Surgery in every form of disease, he can have no idea of the gap to be supplied in his knowledge, if he relies on present physiological creeds.

We must in future look to the Gases for the restoration of the Inorganic fluid elements, to supply the fibrin of the blood with fresh stores of the diluting fluids. We have hitherto relied in disease upon our drugs and our dietings, and have neglected the great fact of Man himself, like all other animal life, being greatly self-supporting.

Man, as an animal, wants only ONE-FIFTH raw material for his support and sustenance, as he manufactures four-fifths himself. The great Science of Medicine resolves itself into the simple process of assisting Nature to do her own work, not to take away the elements and tools she works with. For, as in dieting by the raw material of food, so in Medicine, the physician has only his one-fifth part to do, and assist Nature to do her four-fifths. Other inductions from natural laws more in harmony with the treatment of disease would soon be developed.

THE NERVES.

It may not be time lost to inquire into the great nervous structure of the body, and ask, What are the Nerves? Are they absorbents? Science answers the question that they are. Are we not told that the eye *absorbs* the light, as well as the objects presented to it, its nerves carrying the delights of form and colour to the brain, often indelibly; that the nerves of the ear *absorb* sounds in every variety of modulation, harmonious or discordant; that the nerves of the nose *absorb* scents, and convey odours to the brain of every sort and kind; that the nerves of the tongue *absorb* the flavours of everything having a distinctive taste; that the sentient nerves everywhere situate *absorb* a touch or impingement of any foreign substance on the body? Are there not also, within and without the body, peculiar sensations, which are largely absorbed by the nerves, and conveyed to the great sensorium, the brain—making, in fact, a distinct sixth sense? All this shows the fact that the nerves of all the senses are *absorbents*; yet, on the other hand, they have a negative or reflex action. The eye can see, the ear can hear, the nose can smell, the tongue can taste, and the body can feel in imagination, the objects seen, the sounds heard, the aroma smelt, the flavours distinguished, and thus all the feelings and sensations are reproduced by the reflex actions, almost as distinctively in remembrance by the organs as when first impressed.

It is worthy of further consideration how certain elements first came together to form medullary substances, and how, when they became exhausted (as they would be, like all other parts of the system), they are nourished and supported afterwards. Can the brain, the spinal marrow, the solar plexus, the vast number of nervous ganglia, the whole army of nerves, both sentient and motor, derive their support and nourishment from the blood? Physiologists say they do, but I consider this is open to grave doubt, and that they are nourished from other sources.

Take a child at its birth, it appears nothing but a large combination of Inorganic matter, arranged by natural laws into thousands of parts and organs, differing in their combinations and uses, and all made subservient to each other, but it has no power of appreciation through its senses. It is more highly organised and developed than any other animal, whilst its maternal milk is the poorest of that of any animal in creation. From the moment of its birth it begins to live upon the decomposition of its own organisms and their wonderful reconstructing processes. But this would not suffice unless it had been provided by Nature with elements of great value for this purpose, but of temporary rather than permanent use, so that from the commencement of its existence it begins to supply its own four-fifths of vital nourishment. These facts I made known, as far back as 1845, in the small work entitled, 'Physiology of the Uterus, Placenta, and

Fœtus; with Observations on the Membrana Meconii and Rete Vasculare; Newly Discovered Structures existing in the Fœtus and Young of Man and Animals, with plates; to which I refer my readers.

It shows that the meconium is enveloped in its own peculiar membrane, both being perfectly Inorganic; that the meconic membrane does not lie upon the true mucous membrane, but upon a vascular network; and that this, which lies upon the true mucous membrane, contains a certain percentage of Organic elements. As soon as the meconium and its membrane pass off by natural laws, this vascular network, being exposed to the oxygen of the air as far as the ilio-cœcal valve, rapidly decomposes, and evolves the first gaseous actions influencing destructive processes. These uniting with the first formation of débris of the more solid portions of the milk, make a consistent mass to be deposited in the colon. Foreign matter thus getting into this viscus, soon has its effect upon the vascular network there, which gradually undergoes decomposition and destruction peculiar to all animal matter.

Oxygen being perfectly excluded from this viscus, all those Gases peculiar to and emanating from the contents of the colon are now generated for the first time. Here, then, from the advent of life, we see the colon performing a far higher duty to the well-being and nourishment of the child than any food or aliment which can be given to it. In fact, the phosphates are

herein manufactured with the hydrogens, which, in combination or separately, permeate by Osmose the membranes of the colon, and find their way into the general system. Whilst the vascular network continues in whole or only partly destroyed, these Gases are of small amount and character. How long this adventitious membrane continues undestroyed or entirely removed I have not had the means to determine; but it evidently lasts long enough, until the age of the child points out that more solid and nutritious diet is required. This is one of Nature's wonders in taking care of infant life, which so far really resembles that of the marsupials. It comes into the world an Inorganic being, and it gradually developes the Organic. How long does it take before it can appreciate anything directly brought before the cognisance of its own senses? It may be able to see, or hear, or smell, or taste, or feel, or cry, sufficiently for its parents to know it is not deaf or dumb; but all the appreciative actions of these senses come long afterwards, and only by degrees. Speech is simply a sequence to a cry; but what can anyone tell of the first five years' experience of his life? It is a blank! Yet all this time wonderful things are in progress, and it is upon the care and nourishment, proper or improper, sufficient or deficient or excessive, that the development of the physical powers of life and health depend, and upon these the gradually appreciative quantities and qualities of the senses. But all this is done by the Inorganic elements

developing the Organic required in each case. The great source of our self-deception has been the belief that all this has been done by and through the blood. The nerves are absorbents, as we have seen, in their appreciative faculty of sentient organs. They must be also absorbents of their own nutritive elements, and being so, it is natural to ask from whence they derive their structural elements. The best authorities have shown that foetal blood contains no fibrin, but a larger proportion of gelatin than adults, and very little of any of the phosphates, whilst in adult life there is a very small proportion of phosphates in the blood. The nerves, and brain, and ganglia, and plexuses are stated, in round numbers, to be composed of 890 parts of water, fat, albumen and other inorganic elements in every 1,000 parts, and the other 110 parts consist of phosphorus, phosphoric acid, phosphates of potass, lime, and magnesia. The blood, as I have elsewhere shown, contains only three-quarter parts of the unit in 1,000 parts of every species of the phosphates, whilst the nerves, as I have shown, contain 110 parts in 1,000; so that the phosphates of the nerves cannot by any possibility be derived from the blood. Putting this in a mercantile form: A merchant, starting with fifteen shillings capital each day, is bound to produce one hundred and ten pounds at the end of it. As this is impossible, so likewise do I think are the dicta of the Physiologists, when they say the nerves derive all their phosphates from the blood. Besides, there are

so many other parts requiring the phosphates. Take, for instance, the bones, with their 52 to 55 per cent., the enamel of the teeth from 85 per cent. of phosphates, or respectively 520 to 550 and 850 in the 1,000 parts. This quantity surely cannot be made from three-fourths of the unit in a thousand parts found in the blood, especially when we see in infants' first teeth 62 per cent. of phosphates. At this time of infant life, be it remembered, the blood is not rich in all those elements which afterwards perform so great a number of phenomena in the system.

Returning to the Nerves, I do not think that the blood can supply them with their water, fat, albumen, and other Inorganic elements, for it must be constantly wanting a supply of all these elements itself; and, moreover, both the blood and the nerves are constantly exhausting these stores independently of each other. I apprehend that any reciprocal actions between them consist only in the blood giving to the nerves some of its Organic elements, and the nerves giving to the blood, or rather its muscular developments, certain motive powers and forces.

If Nature, in her first formations of all animal life, pursues a certain course until perfection is attained, we have every reason to believe that she follows the same laws afterwards.

It is supposed that the blood sends out its albumen, and heals cuts, or furnishes growth to flesh, or cures wounds, &c. This surely cannot be, for the

blood is often obstructive to these cures, and is the fruitful source of what is called 'proud-flesh,' causing excess of the growth wanted for repair. If, then, we follow natural laws, as above stated, repair of structure is due to the Inorganic elements, and not to the Organic.

It is well known that the nerves grow and are formed at their lowest parts, and gradually extend and enlarge until they reach the brain. Here they expand and develop themselves, from the first germ of the embryo, as has been demonstrated by Physiologists. Why should it be supposed that Nature alters the law when that embryo has come to perfection? She does not alter, and here she shows that marvellous wisdom we are all trying to understand and unravel. I am inclined to the belief that the thousand terminations of the whole sympathetic system of the nerves are the most active agents for the absorption of their own nourishment.

We have seen that the nerves of all the senses are absorbents, and we must thereby infer that what are usually called their terminations, are in reality the commencement or beginnings of them. It is here that they must absorb all they require of water, fat, albumen, and hosts of phosphates, along with their sensitive and sympathetic actions. Look at the carcasses of animals, and see where most fat is generated, and it will be found around the kidneys and downwards, surrounding the lower portions of the ascending transverse and descending colon and the rectum. The

oxygen here combines with the hydrogens exhaled from the colon, forming a fluid element, which becomes inspissated by carbon; portions of the oxygen are consumed, and the carbon and hydrogen form the fat. The phosphates have again most readily escaped by Osmose from the colon, and are readily absorbed by the filaments of all the nerves traversing these parts, and are carried up the spinal cord to the brain to be immediately used by all the senses. The water, fat, and albumen, also absorbed by them, form the nerve-pulp itself.

These elements have their natural combinations, but never exactly alike, though producing similarity of forms, but yet varied in degree according to the idiosyncrasy of every individual. Hence the great variety of brains, and the great variety of thought in every brain.

If then a reflex action occurs, as I have stated, in the impressions of our senses, it betokens a loss of these elements in their very ethereal essences, the natural sequence being a certain exhaustion. How great, then, must be the waste of the brain and nerves themselves, in their material properties! We are told, and no doubt with truth, that the nerves stimulate the will, and consequently the motive actions, of all animal bodies. It has also been proved that the sentient and motor nerves differ in their formation and character. What are the forces which stimulate these motor nerves? I have shown that a constant re-invigoration of nerve proper-

ties takes place, and that these new nerve-forces furnish ethereal essences, and that exhaustion and wear and-tear of these are a consequence. What becomes of what I may call the dross or fecula of the nerves? It must descend into the system, and be taken up or used in the great economy of the body. This dross, or fecula, which is of no more use in the brain for the development of the senses, altered as it must be from its first specific character, is yet found good enough for Nature to use as a stimulant to motive powers, and thus it is carried off. There seem to be some curious points illustrative of this—namely, that the branches of the *motor nerves* terminate in an ACID FLUID, the natural secretion in the body which keeps up the vital forces, though more or less excrementitious; whilst the branches of the *sentient nerves* distributed over their many surfaces have an *alkaline reaction*. Here is a curious analogy: all diets taken up into the system by the absorbents are always in an alkaline or alkaloid form, whilst all excretions have more or less an acid action. So that the nerves take up their own nourishment in an alkaloid form, and give off their débris in an acid one—the one most fitted for all psychological duties, and the other for motive powers.

Darwin ('On the Descent of Man,' 10,000th B. p. 55) says: 'The gradually increasing weight of brain and skull of man influences the development of the spinal column.' Now I believe this to be quite the reverse,

and that the increasing nourishment of the spinal column by the constant action of this nerve-absorption, influences the development of, and more or less increase of, the brain. As the brain increases, and exercises itself continuously, so it increases, by the simple call upon the spinal column for more nourishment, and often retains more of this for its special uses than it parts with for the motor purposes. Often again, *vice versâ*, by the senses being less supplied by the more ethereal essences of nerve elements from imperfect diet, savage life, and a thousand other causes, whilst the *débris* goes in physique or animal powers. Hence the form of the skull, and consequently its forces, are influenced to a certain extent by a law of nature by regulation of nourishment. So that in some men a small brain will have great mental capacity, and a large brain little, and *vice versâ*, according to certain idiosyncracies. The brain cannot then cause or influence the development of the spinal column, but the spinal column must and does influence and supply the brain.

Here is a great fact to be impressed upon all literary men and scholars, that they should never neglect taking a certain amount of physical exercise to rid themselves of the *débris*, or waste, of their sentient nerve-forces. Many of this class suffer from this neglect as I have often witnessed. This nerve-secula ought as freely to be used up or got rid of as all other excrementitious matter.

The Nerves, therefore, do of themselves absorb and take up all such new elements as constitute their own power and integrity, and are protected by Nature in a marvellously beautiful manner. The microscope shows that nerves do not come to the extreme surfaces, but are situated, according to circumstances and localities, more or less below them; and also that they do not end in fine filaments, but in more or less open truncated mouths. If they terminated on the surfaces throughout the external system of our bodies, I do not think we should be able even to bear our clothes. We should by no means be able to bear the rough usages our bodies are subjected to in the ordinary duties of life. Granted we can appreciate the softest touch, even the elephant knows the presence of a fly upon his thick hide, and will whirl him off if in reach of his proboscis or his tail. This is no direct proof that ours or his nerves terminate in our outer skins; and if they do not, it is certain there must be an intervening structure. As Anatomy cannot err, our present Physiology must. But, whatever this structure may be, and whatever may be its composition, it must be some form of battery, the elements of which being disturbed communicate their impressions to the Nerves.

Let us see what we have discovered in this matter, and put the two side by side. Let us review the modes of suffering from the application of heat. Heat from a sudden or superficial scald, or by gently touching anything that is incandescent, or from the falling

of hot sealing-wax on the hand, produces greater pain than a sudden or deeper impression made by a hot iron through the structure forming the batteries and down to the very nerves themselves. The nerves in the first category are not burnt or injured, and therefore take up the sensation more poignantly in this state, because their batteries alone have been wounded, and not they themselves. In the second place, the batteries are suddenly burnt through, as well as the appreciative portion of the nerves, and even the trunks of the nerves themselves, and consequently they have little power left to feel the injury. The same phenomena are shown in the very opposite actions of cold. As long as cold affects only the superficial parts or batteries above the nerves, the nerves are left free to the acute sensation of pain, which is great; but let the cold penetrate the upper tissues or batteries and destroy them, and the nerves themselves below, by what is called ‘frost-bite,’ then there is no suffering at all—in fact, the individual scarcely knows it himself. It is, then, a fact that all the trivial injuries to the surfaces give greater pain than do sudden and deeper ones. All the superstructure above the nerves is made up of layers of the two skins, fasciæ, cellular tissue, &c., which are composed of Solids, Fluids, and Gases, of various kinds and denominations, each one possessing Organic and Inorganic elements, all in a state of constant interchange from one to the other, and all undergoing disintegration, decay, and reconstruction. These, in all their

wonderful vital changes, form nerve-batteries, so that a mere touch upon any given part, however small, does in some manner disturb the elements, which immediately communicate with the nerve or nerves below. The nerves have not been touched, but a sudden action on their batteries produces an equally sudden alteration in them, or their combinations of elements, which is immediately felt, and according to the force used, pleasure or pain results, be it from a 'kiss' or a 'bite.' In former days, before Anaesthesia was introduced into Surgery, better observations could be made upon these points, and I can but give my own impressions and observations of forty years ago. Given the sweep of the knife for the amputation of a thigh. This first cut, I used to hear from the patients, was the most painful part of the operation. That over, the remainder of the operation was endured almost heroically. The first sweep was not unlike the sensation of a red-hot iron passed round the leg, and the shock more or less great according to the nerve-power of the patient. Dissecting back the mass of skins, cellular tissue and fat, down to the fasciæ of the muscles did not cause so great a pain, because the terminations of nerves were cut away and their batteries removed. Then the cutting through all the muscles to the bone was not so great as the last, because the nerves, deprived of their batteries and terminations, were bodily cut through, and the mere sawing through the bone would give only a vibratory action through the system. In cutting over

a tumour, the first incision was always felt the most; to cut under the fat and round the lower tissues and remove the mass was very much less painful. In all these cases where the batteries were perfect, there was always felt a sharp smarting or burning sensation. Therefore I have reason to believe that after the first incisions through the batteries, the nerves themselves do not appreciate pain to any great extent; nor do I think that in Vivisection, when the interior organs are laid bare, that the animals suffer so much in themselves as many imagine they do. Certain exposed nerves may be punctured on purpose to illustrate certain effects on other parts, and they are found to do so, but they are punctured in their centres and not upon their batteries. If the nerve-batteries are operated upon, pain is conveyed from their points of appreciation, and this is a very different thing to puncturing their centres. I have often attended persons who have had a gun burst in their hands and blown fingers or thumbs partially off, leaving the nerves like a number of dangling threads, and I have had no hesitation in cutting them all away quite down to the sound parts with a strong pair of scissors. According to the patient's account, and he was the best judge, without pain, that is, of such a character as would be supposed by the fact of cutting away such structures.

I fully believe that the Nerves have power to provide their own nourishment and support, and I

consider that they must have in some measure a circulation peculiar to themselves.

As the phosphates are largely distributed through all matter, they are largely taken with all food, and their Gases no doubt become absorbed through all the sympathetic nerves, wherever situated, aided by the sensitive actions of their batteries. Sensation itself is thereby strengthened by the presence of new materials, which is absorbed and conveyed along with them. Thus through millions of small sources the nerve-power is kept up. The bloodvessels forming the beautiful neuralema surrounding the nerves supply them with oxygen, and any hydrogen taken up with the albumen and phosphates becomes neutralised by the oxygen, thus keeping the medulla spinalis always moist, so that the phosphates of all kinds can pass readily through its whole length. The nerves and the brain cannot, as I have already shown, get their phosphates from the blood, neither can they their albumen or fat or any of their structural properties.

The *esprit* or goodness of all this new matter being used for sentient purposes of every description, the exhausted portion returns through the motor nerves for motive powers. Therefore, the nerve circulation is carried on structurally in tubes and not in vessels, unless the whole mass of nerves, both sentient and motor, can by any arrangement be called vessels. Certainly they are enclosed in their own sheaths, but these contain a pith or marrow always moist, and of such a

character as to be constantly renewed like all other structures; but are exceedingly permeable to gaseous and aqueous elements, and thus have the power of procuring and providing their own means of support and reconstruction.

In doing this, Nature has provided them with store-houses at particular parts, such as the ganglia, some of which unite in plexuses, as the two semilunar to form the solar plexus. All these strengthen the telegraphic forces, both in their positive as well as in their reflex actions.

THE GENERAL FLUID CIRCULATION OF THE BODY is without doubt a very wonderful phenomenon in our system, and the variety and number of the elements engaged in this equally so. Certain received dogmas have put bounds to the actions and uses of these elements, and almost forbidden their being questioned. Still this is worth doing, and I purpose considering them from my own point of view, and to class the fluid circulation into three great divisions:—

1st.—The Inorganic fluid elements and their circulation.

2nd.—The arterial, capillary, and venous circulation.

3rd.—The lacteal, absorbent, and lymphatic circulation.

Lastly, the nerve circulation, as being a semi-fluid, semi-solid, and gaseous and fluid combination.

Taking these in their due order—

1st.—The Inorganic fluid elements may be divided into—

- a.* Their first gaseous formations, and their inspissation, as already described.
- b.* Their formation upon the mucous surfaces.
- c.* Their formation upon the serous surfaces.
- d.* Their formation in joints and in every interstitial part of the body, wherever they are wanted for lubrication.

These fluids will be clearly seen not to circulate in vessels of any description, but are the natural seas and lakes and rivers of the body. They flow by a law of gravitation everywhere. They mix, coalesce, and are attracted in streams to supply the deficiencies of one part from another. They soften all the serous surfaces, so that they can play upon each other, as in the pleura pulmonalis and costalis; in the peritoneum, as in the abdominal walls with the external covering of the intestines. They soften all the mucous membranes, and enable them to play upon each other as in the eyelids and eyeballs, and in both these their volume is enormous. They circulate through all the fasciæ forming the divisions of muscles, down their tendons and through every fibre of every muscle, and in all the joints, forming their true synovial fluid. All these streams, of whatever denomination, are compounds of Inorganic fluid elements, principally water, albumen, oily and fatty matter. They are the first in the field in all natural reproduction of the species, and produce within these bodies, by

given laws of transposition, coalescence, decomposition, and transformation of their elements, the first foundation of all Organic germs, or commencement of every atomic distinctive nucleus; and they are not derived from the blood, either arterial, capillary, or venous.

Unless the body and every part of it were lubricated by these streams, every Organic action as well as function would cease.

I have already spoken of their loss in fever; and I will allude to them now, in connection with what is called 'spasm of the heart.'

The physiology of this can be explained as arising from two opposite causes: first, that the muscles the heart may have excess of these Inorganic fluids amongst their fibres, causing greater distension of them, and consequently pain, and always with excess of fluid in the pericardium; and, secondly, in inflammatory cases there are not sufficient fluid elements to lubricate them, preventing thereby their freedom of action. The blood has little or nothing to do with this, and the nerves only so far as they are bound to give evidence in every disturbance of any part of the body. (See Rheumatism, p. 149.)

Again, 'repairing elements, sent from the blood,' I believe to be a myth. We see this in badly-treated burns; the burnt parts are not sufficiently covered up for the Inorganic elements to collect and form new structures; but these are lost by often fearful discharges, as fast as they endeavour to do so. On the other hand,

the Organic elements, which ought to have been kept in abeyance, are allowed to discharge through imperfectly-closed arteries, capillaries, and veins, the result being large raw places that never heal. In some cases the patient ultimately dies from constant exposure of the terminations of nerves which have never received their new protecting batteries. After a time, if a healing process takes place, the integrity of the skin, cellular tissue, and all the parts around, are for ever destroyed, and never again present a pleasing appearance. Should the burn be in the locality of the *platysma myoides* muscles, the head and neck are drawn down, and the parts for ever disfigured. It is no new idea that all these Inorganic fluid elements and currents have existence in the system, for they have been detected by Anatomists and Physiologists, who, however, could never make them out. They have only wondered at their behaviour, in the progress and growth of Organisms or Organic structure, and given them some attributes in forming and regulating movements even before the bloodvessels, or even the heart itself, were formed. They have looked only to the behaviour of fluids in the perfectly adult state, when all the carrying vessels and the heart were performing their regular duties, and then made the physiological error we see expressed both by Drs. Parkes and Murchison, that every fluid comes out of the blood or its vessels, and goes back again to them.

There are many forms of disease not specific in

their character, but depending on some Organic lesions, high functional disturbances, excesses or obstructions somewhere to the flow of these Inorganic Fluids: such, for instance, as serous fluids finding their way on to mucous surfaces, and mucous secretions into serous cavities. Yet excesses of these never coexist with fevers, and never produce inflammation. Difficult as dropsies are to remove, from the effects of high functional disorders, they are never cured when produced from true Organic disease of any organ which is itself incurable. If such a phenomenon were to take place as a raging fever, with dropsy of any kind, all these excesses of Inorganic seas, lakes, ponds, and rivers would soon be dried up; but Nature cannot hold two such opposite conditions. I have often tapped for ascites—have taken, say, to-day a common house-pailful of serum. In a week afterwards I have taken two more, and might have gone on doing so. Here is an instance of the gravitation of all the Inorganic elements to one spot. All this shows how plentifully and how fast these Fluid Inorganic elements are made.

In the operation of opening the pericardium, by Lechmann, which Drs. Parkes and Richardson quote (p. xiv.), he calculated a quantity of serum equal to 30 pints, as probably made therein in 24 hours. According to Drs. Parkes and Richardson's theory, this was made from the Blood, and then immediately afterwards reabsorbed into it again. It only shows that an outlet of this character having been made, gravi-

tation from every surrounding part took place, because a vacuum had been formed. This fact can be exemplified in every hospital every day in the week. A patient may come in with a very inflamed hand. Let twenty or thirty sharp punctures be made with a lancet, and the hand plunged into a basin of water as hot as can be borne. The *vis-a-tergo* of force of the Inorganic currents, coming from each puncture in streams, shows that every puncture made is a vacuum when held under water. After a time, when the water cools, get another basinful as hot as the first, to excite a further exudation. As soon as the first basin of water gets cool and settled, pour off the supernatant liquor, and take up the albuminous and other matter discharged, coloured only with blood, but amounting to 1 or 2 lbs. in weight. How much real blood or true organic matter is to be found in all this? Not perhaps 2 per cent. The Inorganic elements, finding an outlet, have come from all quarters to these punctures, by the common laws of gravitation. Very little has come out of the blood; and this may be proved, as I have often done, by first examining the condition of the patient—his tongue, his pulse, and heart and lung actions—because persons in this state are generally below the standard of health, and at first very fearful of the operation, and their nervous powers are a little shocked. But I have made them stand up before a table to undergo the operation, and wait in that position till all was over. Then, if anything, the

pulse has been firmer, the tongue showing more vascularity, the countenance more cheerful, and exhibiting not the slightest trace of the loss of blood, which would have been palpable if all this matter had been robbed from the blood. Lechmann's experiment, therefore, confirms my views of the gravitation of Inorganic Fluid elements from vacua artificially produced, and the fallacy of the conclusions of Drs. Parkes and Richardson. The Inorganic Fluid currents obey all the laws of such elements by finding their level to any outlet. Even a common blister shows this.

2ND.—THE ARTERIES, CAPILLARIES, AND VEINS.

The ARTERIES are the well-known great conveyers of the Organic elements and oxygen to all parts of the body. The Organic salts of almost every variety contained in these are eliminated by the glands for secondary uses. The oxygen they contain permeates the deepest glands and substances, and the value of this in the brain is scarcely to be estimated; and is, I apprehend, one of the great liquefiers, by combination with the hydrogens of this most wonderfully enclosed organ. Whatever Physiologists have said of the undulating action of the brain being due to the corresponding synchronism of the actions of the heart and the lungs, they still are at fault when the calvarium has been removed soon after death, when no two such actions can take place, whilst the motion of the brain still continues. I can only account for this by thinking

that much movement of elements is still taking place up the medulla spinalis, and that much oxygen must be given off by the pia mater, or congeries of blood-vessels enveloping the brain, even after death, and hence the movement of the brain even in death. This movement of the brain may therefore be considered as the simple mechanical combination of elements formed by these Gases.

It is necessary, therefore, that the arteries should be always kept supplied with their pabulum vitæ, for they soon exhaust themselves, from the multiplicity of work they have to do, and parting equally rapidly with all the rich elements contained in them; and if this is not enough for them to do, I do not know what is, but here again they are assisted by

The CAPILLARIES, which may be justly called OBSTRUCTORS, to prevent the more organised secretions of the arteries from being expended too rapidly. This appears to me to be one of their great uses, for they only let such elements pass as shall strengthen the fluid in the veins, but keep back all those which are really wanted in the system, by their antagonism to the pulsation of the Heart, and thus assist the Osmose of the arterial elements and the passages of the Oxygen to the innermost recesses of the body.

On reflection this is a great mechanical design, for there are no pulsations in them or the veins. I fail to see how the capillaries themselves can supply terminal beneficent properties, as has always been believed that

they do. They may be subject themselves to temporary enlargements, but this is better than having their calibres distended by arterial albumen, fibrin, &c., which is a fruitful source of fatty tumours. A want of integrity in these vessels often produces thrombosis in the veins, whose channels should be kept clear of any excess of the solid portions of the blood, which would impede its return-flow and weaken their valves.

The VEINS, which may be considered more as the channels for the return-blood for diluting purposes than anything else, and to act also as absorbents. Hence, as mere volume is concerned, the veins always carry more blood in them than do the arteries, and the circulation not being by pulsations, but by the *vis-a-tergo* of force at their commencement, and attraction by their terminal vacua or (as some physiologists say) of the auricle-suction of the heart. Hence we see that this triple circulation must be carried on in vessels, and though continuously, yet with no open ends.

3RD.—THE LACTEALS, ABSORBENTS, AND LYMPHATICS.

a. The LACTEALS, as all Physiologists agree, take up the newly-formed elements of all fresh ingesta, as the chyle, &c.

b. The ABSORBENTS, in association with the veins, take up all those elements which would otherwise oppress the internal structure with excesses of partially Organic and partially Inorganic elements.

c. The LYMPHATICS are nothing more nor less than regular scavengers, but are, nevertheless, the most useful members of the great circulating media. They appear to have their depôts at certain parts, which Physiologists have variously designated as *Glands* and *Ganglions*; but these Lymphatic depôts partake of neither the true glandular character, nor nervous ganglionic types. I think 'depôts' the best term to use for them, because they seem to store up great quantities of Organic elements, which are necessary for life when food cannot be got, or taken when it can. As there are so many points yet unsolved in Physiology of how life is kept up, or sustained, in every healthy as well as in every diseased condition, I have already stated that man is a self-supporting animal.

If he takes or consumes more elements than the one-fifth necessary for his vital forces, they become in excess of his requirements, and he has the diseases incidental to that state. If he does not take or cannot get the one-fifth raw material, he calls upon his system to make more than the four-fifths. As long as he can do this, and has not exhausted his stores, he may go on for some time; but when his stores become less and less, he is subject to another class of diseases. These may take place in the midst of plenty, disease as much preventing him taking food, as it does others in a perfect state of health, where nothing is to be had, and starvation is before them. The first act of Nature, then, in all these cases, is to look to her own commissariat,

and this she does by first using up the Inorganic fluids, which she soon exhausts. She then goes to her oil-cans, the fatty deposits, wherever situated, and squeezes out of them what she can for the mere lubrication and diluting of the Organic elements. After exhausting these, she seeks aid of her faithful scavengers, the Lymphatics, and sees what they have provided for her. As long as they can supply the means from their stores, and these combine with the Inorganic elements still left, life is sustained. When all these fail, as fail they must, and Nature can get nothing more out of her own system, she becomes exhausted, and sinks. All these phenomena are shown in a thousand ways, from the first act of appropriating whatever she can in the easiest and readiest manner, and afterwards committing burglary on her own premises, and seizing upon anything she can despoil to convert into life-preserving forces. In the healthy state these actions are shown in the constant demand and supply of everything required—then in the way of healing processes from injuries. Where Nature has been lavish in supplying materials for these purposes, but has left behind unused masses, or, after severe boils, lumps are left for Nature's carpentry to smooth down, her faithful scavengers absorb these excesses until no trace is seen of them. In the repair of broken limbs, or from amputations or very large abscesses, a certain amount of pus may exude; but there is always a great amount of Organic and Inorganic material to be

carried off, some way or somehow. Again, in old or even middle-aged persons, who form the diseased and the ulcerated-leg class (and their name is legion), it will be often seen that these terrible-looking sores gradually heal up, for Nature has even stolen from these some life-preserving properties ; at the same time the sufferers get thinner and thinner. Nature in these cases begins to succumb—nourishment cannot be taken ; and so the stealing and burglary goes on everywhere, until these scavengers can find no more vital elements to collect, and death then closes the scene.

All these acts of the Lacteals, Absorbents, and Lymphatics are carried on, according to their own laws, but are, with the Arteries, Capillaries, and Veins, greatly dependent upon the Inorganic Fluid elements for their supply of sufficiently diluted currents.

The commencement of the Lymphatics shows a distinct structural character, or funnel-like shape, for the greater facility of taking up their spoil ; yet these are no doubt furnished with a filtering apparatus, to maintain all they take in a fluid state, for unless this was so, perfect liquid flow would cease, and Nature be found bungling with her sewers, as engineers and architects do with ours. Nature never bumbles in her engineering. It is clear that these three distinct circulating fluids are contained in vessels with no open mouths, but with powers of carrying their contents to their proper destinations.

Of all this wonderful variety of circulating media,

we are lost which to admire most,—the Inorganic Fluid elements, circulating and permeating everywhere freely, and not in vessels of any kind; or the arterial, capillary, and venous currents, circulating in their especial vessels, all three of which have distinctive powers and uses. The Lacteals, Absorbents, and Lymphatics, being vessels, convey their own currents, each set being endowed with separate duties.

Lastly, the NERVE CIRCULATIONS, the substances of which are composed of a semi-fluid, semi-solid consistence, and are conveyed in tubes. The Nerves provide for themselves, and support their own structures, giving every sense of pleasure and pain, through every organ specially allotted to convey these actions in their sentient capacities, and ultimately to give all powers and forces to all parts requiring them, by their motive characters.

We see, therefore, that not one of all these divisions of the circulating media can do without the other; all are dependent on each other in millions of ways; all give and take, and mutually assist each other. But when Physiology narrows the limits and forces of the body, all its upholdings, constructions, and reconstructions after injuries, and, in fact, its very existence, and assigns all these to one circulating medium alone, THE BLOOD, and gives this a pre-eminence, and sole power to do and supply everything (as it has most unwisely and untruthfully done), it is time, I think, to reconsider the whole plan of Nature. I have every

reason to believe that nearly all diseases, and all the laws which influence them in their process of development and retrogression, are regulated by either the healthy or morbid condition of the fluid elements, and that the true practice of Medicine should be founded upon the knowledge of their states and conditions and their great chemico-vital balance. Not only is this the case, but, as I have endeavoured in my diagrams to show, the all-pervading presence and influence of the Gases are the greatest of all the elements in the body, and their never-ceasing combinations are the largest factors in the whole system. We may be lost in surprise and astonishment at all these wonderful actions. If we once combine the geometrical and mechanical sources of life with its chemico-vital and electro-vital forces, we shall feel no regret at parting with dogmas which I believe to be untrue, and only upheld because they are believed in, and, whilst they are taught, they are not really understood. If, then, our present physiological dogmas are at fault, what must be the practice of Medicine founded upon them?

Every Physician with half-a-century's or more experience, and just on the threshold of another world, candidly confesses he does not believe in Physic, just as Sydenham beautifully expressed himself, 'that after studying and writing on Fevers for fifty years, he had only collected so much dust to throw into his own eyes.'

I have here merely given a few of my own views

upon many great physiological points, with the hope of having suggested subjects for thought to other minds.

When this Work came out anonymously, seven years since, it met with no encouragement to the Author. Certain copies were sent to eminent individuals as presentations, and the only reply I had was from Professor Owen. Subjoined is a copy of his letter, which is as gratifying and complimentary to me as it does honour to himself; for few men can overcome prejudices, or see in new ideas any truth. I have not the pleasure of Professor Owen's acquaintance, and to the best of my knowledge he knows me not:—

(Copy).

‘ Sheen Lodge, Richmond Park.

‘ Professor Owen presents his respectful compliments and thanks to the Author of “Principles of Organic Life.” He only regrets that (owing to the modesty which accompanies true genius) the Work is anonymous, and he is unable to feel towards the *man* the sentiments he entertains for the Author.

‘ 14th July, 1868.

‘ To the Author of “Principles of Organic Life,”

‘ Robt. Hardwicke,

‘ 192, Piccadilly.’

I now publicly thank Professor Owen for that

letter, and as no restriction was put upon my divulging it, I publish it in this Preface to my Book.

BENJAMIN RIDGE. M.D., F.R.C.S.E., &c., &c.

21 BRUTON STREET, BOND STREET, W.

22nd September, 1875.

PREFACE.

WHAT is that mysterious reason which deters the majority of educated men from the study of their own bodies?

This is a question which may well be asked when we see how Natural History engages their minds so universally. Geologists and mineralogists dive into the bowels of the earth for all its INORGANIC wonders, and by the aid of chemistry and other sciences find the germ of matter which enters, in many of its forms, into ORGANIC life. This, however, necessitates the study of PHYSIOLOGY, without which they can have no basis for any knowledge they may acquire, and in the absence of this, all they attain to must be incomplete. The alkaline earths furnish valuable materials to vegetation; the ferruginous yield useful products to man; and the carboniferous assist him in every operation of the conversion of all minerals into thousands of useful and ornamental purposes. A piece of coal realises the dogma of the ancients in their

conception of the ubiquity of 'THE GODS.' They called Fire, Air, and Water, *par excellence*, 'The Gods.' The two former were deemed the great interposers in all things, as they mixed with and were in everything. Hence in the Heathen Mythology, their ubiquity or 'Spirit' was recognised everywhere. In later times this universal denomination of Air became dignified by the name of 'Gas.' Air was called by the Greeks, 'Pneuma;' and by the Latins, 'Spiritus;' and our acceptance of this ubiquity of the SPIRIT of 'the Gods,' conjoined with the more expanded ideas of the attributes of the Deity we all now worship, is more highly designated by the words, 'Omniscience and Omnipresence.' The heathen attributes, however, we do not confine to so narrow a compass, but add to them the general laws which reign everywhere in their various combinations and attest 'His Spirit' as manifested in everything. A piece of coal then has within itself the germ of fire, heat, and gas, or air. There can be no doubt of the truth of the dicta of geologists and mineralogists, that earth, stones, and minerals grow, that is, they increase by aggregation of particles under certain conditions; but neither move, feel, nor procreate, nor have they either instinct or reason.

Heat, fire, and caloric, admitted to be synonymous terms, have been fully recognised in modern chemistry to exist everywhere, in everything, under the term latent, from being hidden, and as the ancients delighted to place everything under some presiding god or goddess,

so they appointed their deities, from which originated a sect who worshipped darkness. As, therefore, the recognised property of these deities when unearthed was 'Air' under whatever name it may be called, whether air, breath, exhalation or radiation, modern science justly designates it as gas, because when once it escapes into the atmosphere, it is sure to combine with whatever properties it has most affinity for, and to gain more or less a moisture; whereas that which escapes from moist substances is already charged with it as well as its constituents. Therefore, we see plainly that heat, air, and water were justly appreciated by the ancients; and the moderns only improve upon their ideas as science becomes more developed. Hence the very first step in the physiological study of Natural History rests on this basis.

Thus viewing the earth and all its creatures, seeing that it has heat, air, and water, we come to the most natural conclusion, that it is the fittest place for vegetation and that vegetation absorbs the gases of the ground, laden with the elements it contains, and in this form makes use of its properties by its own process of election. Look then at vegetation! What do we find? Simply inorganic matter more or less vitalised. Can it live without the earth? No! Is the earth merely a place for it to rest in, in order to grow? Certainly not! Every form of vegetation, whether from original seed or strikings, possesses increasing powers of itself, but those which they have within themselves

are not sufficient for the purpose. They therefore use the inorganic elements of the humus of the soil to develop what they have in themselves, and this comes to them in the form of 'Pneuma' or 'Spiritus,' or, in modern language, air, exhalation, gas. This latter is the most perfect term, for it implies an union of many properties and always comes laden with or charged with caloric and moisture in combination with the inorganic elements of the soil; such as potash, soda, ferruginous or bituminous properties; or any other which are the immediate components of the parts in which they grow. The result follows, that vegetation seizes on and makes use of what it requires by a species of election, and this simple fact agriculturists, florists, and horticulturists have found out. The first by rotation of crops; the latter by studying the particular amalgams of the soil which produce the finest specimens of everything they cultivate. Therefore it must be apparent that the gases from the soil are so impregnated with everything it contains, that it is due to them that vegetation is under the control of science, and that its inorganic elements finding their way in the form of gas are thus vitalized in the plant. Let me not be understood to say that the plant owes everything to them; not at all, because it has its own original elements, which make every species so distinct. It has its own laws of combination of elements, and these amount in plain language to the solids, fluids, and gases; the interchange of which and the forma-

tions which ensue causing similar phenomena of combination and ending in the same result. Yet from the impossibility of these varied elements ever being in exactly the same proportions, this fact ensues, that they cannot always combine in a precisely similar manner. Nourished, then, from the soil and a thousand skiey influences and by the laws of its own nature, all vegetation is what it is. It uses everything it can get by absorption, which it combines with its own properties. It grows; has a varied life according to its kind, and procreates its species; but it cannot move or feel, nor has it instinct or reason. It imparts its own gases charged as they must necessarily be with elements which it contains, and hence the varied odours of every plant and shrub

We next come to animal life, and find the same laws more intensified, inasmuch as more numerous elements are engaged in all their processes. Where the organic capacity of vegetation stops for want of further development, or as having completed every necessary design, animal organism advances upon this; and as we see that different parts of a plant have often a distinct aura or gas; so every part or organ of an animal is marked by a similar characteristic. The odour from their breath, or lungs, differs from that of their stomach, these again from other parts, especially their faecal organs, and these again as well as all anterior organs, from those of the surfaces of their bodies, and even parts of these differ from one another.

As, however, the gaseous vapours from the manure of the soil are absorbed by vegetation, and as plants do not possess organs for storing them, they are immediately used and disposed of. Not so with animals, for no animal who eats, digests, and absorbs, is free from the defæcating process, which is the natural result ; and hence we see a storing organ provided for the purpose, and being provided we cannot say that this is only a reservoir or its contents useless, awaiting only the animal's convenience to get rid of it. It is much more than this. It answers to and corresponds with what the earth and its stores do for vegetation, and no other philosophy can exist on the subject, than that the animal is compelled to carry its own manure about with it, the gases from which are just as useful and necessary to its existence as the gases from manure are to vegetation. But it is not from the gases of the manure-organ or colon of animals alone, that they depend for many useful elements of life ; but upon those of every other organ in their bodies, every one of which, either from its speciality of formation or the secretions it makes or excretions it evolves, furnishes them with all their given supplies, and which are as absolutely necessary to animal existence as the atmosphere they live in, or the solids and fluids they take. According as all these combine, and as I have said of vegetation, there must be departures from perfect precision of combination ; so therefore though the species is the same, there must yet exist a difference,

which is as palpably seen in a litter of pups, as in all other animals of whatever description. We see, then, that animals below man, grow, move, feel, procreate, have an instinct and an independent existence, and when once formed are more dependent on their own self-supporting vital elements than on any foreign ingesta. This I have endeavoured to illustrate in the body of this work.

When we come to man, we find every property of the earth, vegetation, and other animals wonderfully combined, as might be naturally inferred by the higher order of his organism and powers. In fact his gases are more laden with elements of every character, their combinations are more varied, and more intensified and more poisonous than those of any other animal. That whereas those mighty and wonderful combinations which in all below him can at best only terminate in Instinct, in man they culminate in Reason, Thought and Speech. His nature partakes of something of everything below him, while nothing below him can approach his superiority above everything. If, then, he dives into the earth and sea, and raises his head and faculties to the atmosphere he lives in and all that live by it, and his mind soars to the heavens and the wonders of the great firmament itself, why, may I ask, does he not study himself? It can only be explained thus:—If you ask any naturalist the question; he replies sharply ‘that he does not want to be a doctor; I leave all my complaints to the doctors.’ Now this is very

far-fetched, because the object the doctor has in view is what concerns the departure from given laws of health, producing disease which he seeks to allay, to mitigate, or to cure. This the naturalist may surely stop short at. This the intelligent and well-educated man may wisely leave to those whose avocation it is. But surely a naturalist would improve the range of his ideas by tracing facts and laws from Geology up to Himself. It is not, therefore, to the profession of which I am a member, that I alone address myself; it is to open up new veins of thought in every naturalist's mind, that I have written this book. I have also gone one step further than other physiologists, to show that diseases mostly arise from certain excesses or deficiencies of those elements which make up the sum of organic life, and that what is usually termed disease is, in fact, Nature's own effort to cure; in short, her *modus medendi*, to rid herself of vital elements which may be in excess, on the one hand; or her endeavour to get back into the system, elements of which she is deficient, on the other.

Here, then, I invite the pure naturalist to accompany me: and though I am deeply interested in relieving mankind of suffering, he may at that point stop short. But even this is encroached upon, for nothing has been commented upon so frequently by the lay press, as the fact that our present physiology does not serve us. We either place too implicit a confidence in what we know and believe to be true, and hold fast to in the

form of dogmas and authorities; or there are lost points in our knowledge which require further elucidation. We go on listening to our teachers, and our teachers go on expounding what they believe to be true. A generation springs up imbibing all these ideas, without questioning them, thus strengthening authority and dogmas, and not searching out truth for themselves. What is the result? It is told in a few words. As long as ordinary departures from health ensue, or disease becoming of greater magnitude is arrested, or as long as people suffer desperately and are 'pulled through,' everything seems to go on smoothly. But let an epidemic come, it is then that the profession, as well as all their doctrines, fail. The laity then act for themselves, and set about prevention, which becomes the order of the day; while the faculty, having ignored themselves, may be said not to be required at all; still they give their services, not as disciples of Apollo, but because they yet hold some authority among the people, even while they know next to nothing of the treatment of the disease in question. A leading journal (the 'Times,' December 3, 1866) thus remarks: 'The laws of health and disease are at once the most obscure and the most deeply interesting to the public of all scientific principles. . . . High authorities are known to differ upon many of them, and there is scarcely one of which the proper application is not disputed.' Not only are these and similar remarks made by one journal, but they

appear in every journal in some form or other, when any national distemper occurs. Let it be cholera, fever, scurvy, or any other epidemic amongst men, or rinderpest amongst cattle, it is only for the journalist to reprint the leader of a previous year on a similar occurrence taking place, if he is not inclined to write a fresh article. I will quote once more from the 'Times' (January 21, 1867), commenting on scurvy: 'Nor is it merely salt meat which produces the disease, except to this extent—that meat preserved in salt appears to lose a certain anti-scorbutic element which exists in fresh meat. Scurvy has been occasioned by a low diet of tea, milk, and bread among a town population, and it appears, indeed, to depend exclusively upon the absence of some aliment indispensable to the human frame. What this essence or substance may be we cannot tell, but it is as necessary as salt itself, and seems, indeed, to counterbalance the value of salt in the process of nutrition. The negroes in the West Indies live too exclusively upon vegetables—that is, they get an excess of the particular aliment the absence of which produces scurvy. Disease follows, and is cured by the counterpart of the treatment employed in scurvy. The doctors, instead of serving out lime juice to them, serve out red herrings—herrings cured at Yarmouth for this especial purpose, with a double allowance of salt and smoke, till they are literally as red as copper. Nevertheless, though salt cures the negro's disease, and lime juice cures the

seaman's disease, *it is certain that scurvy is not actually caused by salt, and is not cured by acids.* Lime juice and other acids contain the specific, but what that specific is we cannot tell. . . . In short, we know the fact, but not the reason.'

This is the very gist of the matter. We know so many things empirically which, with our deficient knowledge of physiology, we cannot explain. My object, then, is to show that our present knowledge in physiology does not serve us, neither does the application of medicine founded upon it. Let us, then, inquire if it is capable of expansion.

No doubt there are many ideas in the following work that may seem new to book men, but if so, they are old truths to nature. The great bulk of the faculty are so much engaged, that they have no time except for the practice of their profession and the many laborious duties attendant thereon. This leads me to remark on the small percentage of observers and thinkers there are in the great stream of medical men. If observers they may not be thinkers, and if thinkers not observers. Having no reliable or truthful base to go upon, the more they think the more inextricable their conclusions appear. This shows but too plainly that naturalists and the great thinking public do not study or take any interest in their own physiology. They seem to refrain from embarking in any knowledge which affects themselves or the laws of their own being, so that, in fact, physiology may be said to have but few disciples.

It is to lead those under whose province it will legitimately come to consider this subject under a new aspect, and apply it to their own peculiar inquiries into natural laws, and so conduct them to a study of the wonders of their own.

PHYSIOLOGY

IN ITS RELATION TO

PRINCIPLES OF ORGANIC LIFE.

I. IN the study of any science the primary object is to look at its common sense rather than its philosophy, in order to bring it under the control of the reason. If the student cannot do this satisfactorily, owing to there being so many abstruse points in it, he is naturally led to consult the ablest authorities thereon for further elucidation. If he becomes satisfied with their views, he goes no further than crediting them; but if he doubts, he will probably investigate the subject for himself, from other or different points. I may, therefore, say that no science advances except doubt be first thrown upon what is taught or written upon it.

Now this appears to be the case with physiology, which is at present too complex to be understood by simple common sense, because improbabilities and impossibilities meet us at every step. So that, we must either believe and not understand its dogmas; or, if we try to understand these by any common sense standard, we find too much is said to be believed, and

too little to account for the wonderful results we see. There has always appeared to me to be too special an action given to all the various powers and organs of the body, to the neglect of the great general laws governing them all. No points of physiology can be touched upon without raising others which bear upon them, and apparently mixing them all up inextricably. The true end of physiology is not a laborious exposition of every given point, but the discovery of conclusions from the unanimity of all in producing a vast result. Incalculable evils have arisen from the one; incalculable benefits will arise from the other. We search, for instance, for a cause in the immediate part where pain happens to be, and we say, Such and such an organ is affected. We search for the cause after death, and do not find it. What we saw, then, could only have been a sympathy arising from some other cause. Had we found this out before, we could have done more, perhaps, to relieve suffering or save life. There seems to be a philosophy of error, as well as a philosophy of truth. Is it fair to blame an organ when a secretion made in some other is at fault, which is the life of that organ? If so, then the effect is blamed, and not the cause. As this is too often the case, it becomes evident we have reasoned on a false basis.

II. If we take, as a first proposition, the formation of organs, and look at a muscle: it seems apparently a solid structure, yet it is made up of countless numbers of fibres, every fibre separated by a thin skinny lamina. We ask the meaning of this. This muscle could not perform its duties if it was a solid mass. It could not yield that wonderful flexibility when, in the various contortions of the body, some of its fibres

become elongated and others contracted, even in the same muscle. It does not follow, that from the great number of muscles that each only stretches or contracts in certain movements of the body. One single muscle may have powers to do the same throughout its whole extent. If this were not the case, we should have neither acrobats nor even opera dancers; nor should we be able to perform those wonderful feats of muscular effort which we occasionally do. As such fibres are so infinitely divided, to make up one muscle all must be kept lubricated. How simple, then, to imagine that these laminae are the means of conducting the lubricating fluid, giving easy play to every fibre, and that every fibre compressing the laminae causes a gravitation of the lubricating fluid to the tendons! Then we must presume that the lubricating fluid enters at the upper or bulky end of the muscle, and traverses the fibres in the direction the muscle lays, or is commonly used. Look, again, at the skinny mass that lies between muscles, whereby anatomists are able to separate them. Here, then, the lubricating fluid far exceeds that of the laminae between the fibres of the muscles themselves, because of its greater exhaustion from the play the muscles have, the one over the other. What, then, is this lubricating fluid, and where does it come from? Our physiology tells us it comes from the blood. This appears to me an error at starting, even on so simple a question. Then, if it is not from the blood, from what aqueous source is it derived? Am I not right in saying that no point of physiology can be touched upon without immediately raising up a thousand others? Look at the heart! Whatever ideas we may have previously formed of its structure

have been set aside by more recent dissections. Hitherto dissections have been made direct on the raw material, and we have lost much of their value, because the scalpel could not penetrate them. Now, however, a partial boiling has been tried, and the scalpel, directed with intelligence, has found, as regards the heart alone, that it is made up of many layers of muscles, which run in different directions, having neither origins nor insertions, for both are lost at their terminations. The fibres of these muscles may be termed legion, and must be kept well lubricated. When we know these facts, we can better appreciate the heart's action, which commences with life and ends only with death, however long or short that may be. Taking, then, these circumstances into consideration, we are at once impressed with a startling idea: that every muscle, in its commonest action, and much more so in its highest exercise, and again when all are combined, employs and eventually uses up an amount of lubricating fluid which is quite wonderful to think of, or even to calculate. Whatever we may have been taught, and whatever we may believe, as to the origin of this mass of fluid as being supplied by the blood, I do think that we have reasonable cause for doubting this generally received opinion, and, unless we doubt, we cannot advance upon it. Here, then, are organs which may be termed exhausting ones, in fact, users and not suppliers of their motive agents, yet having their duties, and being of themselves powerful auxiliaries in the body.

III. To follow this subject, let us take the glands, wherever they may be situated. These organs are always more or less imbedded in fat, and make a

secretion. Now, these again are large users of fluid elements, but they yield something towards the economy of life; for what they make the system uses again. Here we see the self-supporting power of the system somewhat displayed. Their secretions tell up enormously to the fluid constituents which the body requires; their basic elements are the salts in various proportions derived from the blood, but the percentage of water in which they are contained is absolutely fabulous. Here, again, physiology ascribes this also to the blood. On the very face of it, it seems an utter impossibility; for, if we ask the question, Can the blood or its serum bear such a loss, combined with so many pounds in quantity supposed to be supplied from it for the lubrication of the fibres of muscles and their divisional fasciæ? In other words, Can the blood stand such a downright robbery?—Simple common sense would at once say that it was impossible; and I will give a reason that it is so. In all the arrangements where arteries go to organs, such as glands, and these organs perform their double duty—first for themselves and their own integrity, and secondly to make another element—the veins are larger and often show a double set, as if they actually carried away half as much again and often double the quantity of blood to what is sent by the arteries to these organs. Now this is a curious fact, because the veins themselves not only receive the residual blood from the arteries, but act as absorbents for any excess of fluid lying along their course; this excess not coming from the arteries. If, then, fluids so abound in the system that they require these channels for excess, where are they delivered, and why should this excess exist at

all? The question is answered by simply saying that if the muscles can get all the lubricating fluids they require from given natural sources, there are other parts and organs which cannot get similar fluids from these sources, and therefore depend upon the venous currents; for it must always be borne in mind that the whole body requires at least ninety to ninety-five per cent. of fluid.

IV. If, then, we ask, how organs are sustained? The answer is, that this fluid standard must always be kept up, and that the organs themselves are renewed from the organic elements of the blood, but receive inorganic fluid elements from another source to dilute these. Thus those organs which make other secretions to be used again, in return for what they receive, have the power to make the bases of their secretions from the blood, but that the watery portions are derived from other sources. Hence all these organs are either simple or composite in their structure, according to their duties. A great fact is therefore apparent on the very first inquiry into the principles of life, namely that fluids are fabricated in the system, independently of the blood, and are not necessarily conveyed by any given set of vessels to the parts requiring them for lubricating purposes. On the other hand, we have vessels which carry the necessary quantities of diluents to mix with other more highly organised secretions. We then have laws in physiology which have not as yet received that consideration to which they are entitled, and which come under the head of the INORGANIC FLUIDS, to be used as lubricators and diluents, in contradistinction to the ORGANIC elements, which supply ases of reconstruction for the repair of waste.

V. Are organs self-sustaining, and to what extent do they require new material?

There is not the least doubt but all animal life is self-supporting. The amount of inorganic matter which the system itself makes is very great, and which it duly consumes without the possibility of its conversion into elements to be used again. The quantity of organic secretions which it makes to be used again in the system is also large; and, furthermore, even the residue of this furnishes large amounts of inorganic fluids. Therefore it will be seen that there are two distinct processes for the formation of inorganic fluids, and that they have two distinct functions to perform—the one as a lubricator alone, and the other as a diluent. The proportion of foreign elements which are supplied to the body itself and what it fabricates itself seems to me only as one to four, so that the body, for the due integrity of life and health, makes four-fifths itself, and requires only one-fifth foreign matter.

VI. Thus, if we ask, why the solids of the body contain so large a percentage of fluid, and these fluids are so necessary to it, of what do they consist?

The law of matter, being always in a state of decomposition and reconstruction, could not resolve itself quick enough, if solid in the true sense of the word, therefore all our solids contain greater percentages of fluid for this purpose, that they may pass more rapidly from one form into another, and also that condensation of the fluids should more rapidly produce a substantive and solid character wherever changes occur from one species to another. This I apprehend takes place from the action of certain laws of a chemico-vital character in certain given parts. Thus we should not

have bone without a periosteum; nor nails without their matrices; nor cartilage without its peculiar investing membrane; and so throughout all structures, which, though for ever changing, are always being renewed; one peculiar character being that certain things are always found in the same places. Reconstructed as all these different parts are by the fluids, the fluids cannot for a moment be assumed to be of one character, nor coming from one source. One class of fluids, for instance, will supply *basic*, and another *diluent* elements, and a third, only lubricating ones. So that, to make every solid, there are three classes of fluids absolutely necessary, all being independent of each other. Nor is this all, for they require other elements to perfect the work, and these are the GASES, as I will hereafter show. Thus, then, we have two descriptions of inorganic fluid elements combining with the gases, in addition to one organic element, in order to supply the bases of material to form what are called the solid structures of the body.

VII. We then ask, Are the great fluid streams of the body, known as the arterial and venous circulation, sufficient for the purposes they have hitherto been said to perform?

To this query, anyone may say, No! For this reason, that they are both insufficient for the purpose. The duties of the arterial currents have been much overrated, as it is totally impossible that they can do all that has been reported and said of them. To use a homely simile,—can they supply at the same time the glass of brandy and the tumbler of water, as well? For that is what we have to consider. Is it not enough if they supply the principal ingredient? In

a state of health this is all they do; in certain departures from this, as in the anæmic conditions, they do not even do this. If they do not, how is it possible they can supply the large amount of diluent matter, especially when in their course they come to the end of their duties from mere exhaustion of their more solid supplies? Arterial currents, terminating in the capillaries, yield to the veins their residue or fluid menstruum, which travels back, receiving on the way at various parts other fluids, and rushing on in order to dilute the chyle from fresh-taken food. This again in due course becomes the stamina of another round of arterial currents. So that we find the veins carrying a diluting inorganic current, to mix with a fresh made organic one, the elements of this to be again abstracted, to convert these into other matters, forms, and substances; and thus this perpetual circle is kept up. I submit it to any one, and say, that if our present theories were correct, whether they do not imply that the arterial currents supply solid as well as fluid elements of secretion and excretion? Then, to ask the question that if they did, whether the body could exist at all under such an impossible condition. But as these are not facts, as is proved by the venous currents continuing the streams, and that these streams are larger in bulk, though not perhaps in weight than the arterial; it clearly shows that the arterial currents can only supply some substantive organic elements, but cannot bear the robbery from them of the more inorganic elements; for we see these passing into other channels to be used again as diluting agents. It is, then, conclusive that the regeneration and reconstruction of the body, as well as the secretions and excretions

thereof, cannot by any possibility be derived from the arterial currents alone. If we had ten or twenty times the quantity of arterial blood we now have, it still could not do it. We must review our dogmas on physiology, and not assign to the arterial currents duties which it is totally impossible they can perform, from their very insufficiency to do so.

VIII. What are, then, the great feeding tributaries of what may be called the inorganic lubricators, taking them as distinct actors in the animal economy? and, What have the gases of the body to do with its general economy?

As all animal as well as vegetable life is subject to an atmospheric pressure of 15 lbs. to every square inch, what resisting agency has the body to oppose to this?

Dissimilar as these three questions may appear, yet they cannot be separated. It must be evident to all, that if there is so great an atmospheric pressure, there must be a greater internal force to resist it. Whatever proportion that is, cannot, perhaps, be correctly determined, and it may be open to anyone to say what it is. I shall content myself by putting it hypothetically at seventeen, for the sake of argument; so that 17 lbs. internal radiation resist 15 lbs. external pressure; sometimes it may be more, sometimes less. Speaking first of the atmospheric pressure, the oxygen of the air may be termed the pabulum of the lungs. It gets into them by inspiration, and is used, no doubt, for the purposes assigned by physiologists. It is very evident that a large consumption of oxygen is necessary, simply for the lungs as well as the oxydation of the blood in them; but all this oxygen going to the

lungs is very inadequate to the requirements of the body. It is far too transient in its nature and character to do more than a very limited duty; for how much larger must be the quantity taken into the body by deglutition, not only with meals consisting of fluids and solids, but by the simple and constant deglutition of saliva, and again by absorption through the skin? These combined quantities must be something enormous every twenty-four hours. Whence, then, does it all go? Here physiology is not only very vague, but incomprehensively limited in its dicta, such as, 'It is absorbed by the tissues,' 'It is taken up into the blood,' 'It loses itself in the body,' and such like phrases. Now, can this be all? Can it approach in a most remote degree to what actually takes place? This at once shows that the opposing gases generated in the body itself have been left out of consideration. If it was not for the double use of the oxygen, which acts as a destroyer or oxydiser on the one hand, and as food or a regenerator on the other, we could not exist. Its very principle as a destroyer is to disengage gases, with which it immediately combines, or alters, as the case may be, and also to combine with all those gases which are generated in the body itself, and for which it has the greatest affinity, the chief of these being the hydrogens. Can we then say that the gases are merely elementary and have no distinct uses? Can large quantities of hydrogen be generated in the body, and can large quantities of oxygen be taken into it, and no specific results ensue more than physiology has at present admitted? It is totally impossible to imagine such a thing.

I have already spoken of the large amount of inorganic

fluids permeating all structures and lubricating all fibres and fasciæ, which cannot by any philosophy or argument be assigned to, or as emanating or supplied by or from, the blood; nor from the liquids we take, nor from any moisture our bodies can absorb from the atmosphere. Neither the solids nor the fluids, in any form or combination, could, of themselves, give that roundness and plumpness to the body which we see. It is to the generated and continually mixing gases in their vital activity that we owe this. The fruit upon our trees and a thousand phenomena in nature testify to this truth. Matter in a state of decay or death shows that the gases are vital as well as non-vital; and if they combine, it is only to evaporate, and in this act to carry off substance; whereas in their vital actions they increase and develop substance. Therefore, for the general health and economy and even structural production, the gases are of as much importance as the solids and fluids.

If we leave out of our calculation the value of the gases, we leave a thousand things to be accounted for, at the mercy of conjecture and supposition; and the reason why we cannot now account for many phenomena is because physiology has done this injustice to one of the greatest powers in the whole animal economy. It then appears evident that, if our bodies generate vast quantities of gases, and amongst them the hydrogens in a large proportion, and absorb and take into them, on the other hand, vast quantities of oxygen, it must follow that an equally large amount of fluids is the result of the union of these gases: so that, meeting in every part and under every given circumstance, they are the true sources of those inorganic

fluids which act as lubricators, independent of any fluids we take, or of the great vessels, such as the arteries and veins. It seems really impossible that such an amount of fluid can be eliminated from the blood; and if it does not come from the sources I have indicated, from whence does it come?

IX. As it is admitted that great chemical actions are always going on in the body, as well as electrical or galvanic, and that heat is a prime mover and instigator, what may be the gradation of all these? Are one set produced by another, and do these again produce the third, and is this again contributory to the first? For it is on such reasoning alone that we can arrive at a general knowledge of facts, and not by the isolation of anything; for *this* is never done in nature.

Here, then, are three points to be considered:—We can have no chemical actions in the body without the combinations of fluids, solids, and gases; we can have no union of either two or all three of them without electrical or galvanic actions; and we cannot have electrical and galvanic actions without caloric being produced, and we cannot have caloric or heat produced without distinct gaseous aura being evolved. Such a thing as isolation of any of these facts in the living body is impossible; for when heat or caloric is produced, it again assists chemical action, and so the great wheels of the machinery, inseparably intermingled and assisting each other, are all in their own peculiar manner and by their own forces inextricably united for one great end.

Let any theory of vital power be propounded: the theory of support, the theory of repair or of waste, the theory of reproduction, the cell theory, the theory

of life, of motion, or any other theory whatever bearing on life,—the fact of the chemico-vital actions of decay and reproduction, or reconstruction, must depend on the presence of solids, fluids, and gases, and on the integrity of these in producing electric and calorific agencies to aid and assist in keeping up the very forces which produced them. Many works have been written on the sources of heat in the animal body, all having a tendency to give great powers only to given parts; whilst I see the fact, that heat is produced by the combination of elements, as above recited, in every square eighth of an inch of the body. There is not a single part, however minute, that is not a small furnace, and the thousands of sources thus combined make heat everywhere conspicuous. The smallest puncture causes throbbing, and the smallest fester gets its superabundance of caloric, induced simply by the quick electrical actions going on to reconstruct a new and throw off a dead portion, however small, until the part subsides to its natural condition. It may be excessive—it may be deficient for the purposes of restoration—and, simple as this may appear, it has yet led to much suffering in animal life from being misunderstood. Heat is not, and never can be, a power *sui generis* in the body. It is a power dependent on reproduction by elements of the body, and when produced assists the very organisms and actions which produced life. No radiation takes place from cold surfaces; therefore, heat lost in the body shows other agencies lost: let these be restored, and it returns. Why do we galvanise a paralysed limb, or apply artificial heat externally? It is to set actions going, in order that they may more effectually do it themselves.

If they do not, when we cease our applications, the want of caloric again occurs: a plain proof, I should say, of the conclusion, that heat is made a power, first by chemico-vital laws within—the body retaining this as long as it is so made, and again helping in making that which has made itself. Therefore, to strain any arguments or combination of forces, or to give one part more credit than another, or to limit in any degree to any given organs, that which is done in every square eighth of an inch of the body, and without which the body could not exist as it does, is to limit a grand combination of mighty actions producing as mighty results to specific centres. The present reasoning on all these matters is too contracted to be entertained by any minds who desire to extend themselves, in order to comprehend Nature's universal and expansive powers and ends.

X. As physiologists have spoken so much of the Organic and Inorganic structures, and the Organic and Inorganic elements of the body—how and by what means can they be distinguished, and what are their relative uses separately from, as well as collectively with, each other?

Whatever may be said on these subjects can only be arbitrarily put. Thus, we may call the stomach and all the chylopoietic viscera, the glands, the liver, the brain, eyes, ears, the genital organs—organic structures, because they are reproductive. We also call the heart and lungs organic structures from different causes: the one is always in action, receiving and yielding two distinct currents of blood; and the other, two distinct currents of gases; both in their own way being pendulums to the great machinery. We

call the kidneys and skin organic structures, because the one has a double duty—first, to relieve the blood of a surplus element on the one hand, and carry away superfluous inorganic fluids on the other; so again, the skin which radiates superfluous heat and moisture, and absorbs a revivifying gas—the oxygen.

But we are not accustomed to call muscle, fat, cartilage, bone, and such like structures organic, because they are neither reproducers nor carry on given distinctive organic currents. We can lose many and much of them, as the case may be, and do without them, as well as the great river carriers—the arteries, veins, capillaries, absorbents, and lacteals in those parts: but there are some of all these descriptions which we cannot lose without life at the same time.

It is only for the sake of studying these matters that I put them in such a light, showing the propriety of the acknowledged physiological classification, and by what means they are distinguished, as also their own distinctive uses, and that these would not be of the value they are, unless they played into each other's hands by one furnishing to the other such products as are necessary to their own, as well as mutual existence.

If we ask, what are the organic and inorganic fluid elements of the body in contradistinction to the solids, we come first to the chyle made from new ingesta and the different organic elements brought from all parts of the body by the veins, absorbents, and lacteals, which would otherwise be wasted. But Nature, knowing no waste, secures these in her own marvellous manner, and in all the *bases* of these currents are true organic elements fitted to form fresh arterial fluid.

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But we cannot for a moment admit that the large percentage of water in which these are mixed is an organic element, when it is only used for the sake of dilution. A muscle, or a bone, or a cartilage, cannot circulate in these streams, though their elements do. In these streams, therefore, the nuclei of organic structure—organic secretion, and organic excretion—exist; but wherever these are deposited in health, abstraction of them alone takes place, while the inorganic elements pass on. But even when the *organic* elements are deposited from these streams, they are sure again to find other *inorganic* fluids to mix with.

If it were true, which physiology asserts, that all structure and secretions are made from the blood, organic as well as inorganic, what a pretty state the system would be in! The arteries, robbed of their inorganic fluids, would soon be exhausted, and we should want no veins at all. We are indebted to the veins for carrying off the inorganic elements not required, yet containing, as they must do, some yet large proportions of organic elements in order to mix and dilute the fresh-made chyle. In addition to which, by the time this dilution has taken place, the absorbents and lacteals, as well as the veins themselves, acting in this capacity in their onward currents, have collected from the body itself organic elements which would otherwise be lost. To what extent these fluid organic elements of the body are in proportion to the fresh-made chyle from new ingesta can only be conjectured, but I have always considered it as amounting to four-fifths; so that, if the body itself in its self-supporting powers yields this, we only want one-fifth raw material. If it gets less than this, it must yield more itself, and

so becomes exhausted; and if it gets more, it becomes repleted. In the one case, we have diminished vital action; in the other, excess, with all its attendant evils.

Therefore, we see distinctly the separate uses of the organic and inorganic structures and elements, and also that the one could not be brought into perfect usefulness without the other. This law of the diluents has not been sufficiently considered hitherto, nor has that which exemplifies the large manufacture of inorganic elements to be used as lubricators alone. This subject, however, naturally brings forth another.

XI. Is fat an organic or an inorganic substance? how is it made? and, what are its uses?

That it is not organic to the extent I have shown other organic structures to be on account of their reproducing powers, yet still it is an agent to organic support. Physiology says, fat is made from the blood. I say it is totally impossible; for if we separate the serum from the blood, and abstract all the fat we can from the clot or fibrinous portion, the amount will be found so infinitesimal, as to appear only sufficient for lubricating the general current of blood through the vessels. For such alone appears to be the use of any fatty or oily matter in the blood. I doubt, likewise, the dicta of physiologists, that fat is made from eating fatty things; for the simple reason that the Herbifora, who live on vegetable matter alone, get immensely fat; and if man was fed on vegetables only, he would not get fat: for many fat people are not vegetarians, and many thin ones consume them largely. Therefore, vegetables *per se* are not to be considered fat yielders, neither is meat. We must, therefore, seek some other

source for the production of fat; and we need not seek it long in vain. I have already spoken of the large amount of fluids in the body, which have no connection whatever with the blood currents, so far as emanation from them is concerned; and I have also alluded to the uses of the gases generated in the body, as the opponents to the pressure of the oxygen of the atmosphere. Nothing appears more simple than, in the reduction of solids in the body, that gases are a large product, and that hydrogen gas especially has a fruitful gasometer somewhere. If we admit those wonderfully beautiful laws of Endosmose and Exosmose—the one for absorption, and the other for exhalation—we must also admit the constant contact within the body of opposite gases; and, if we are to believe chemistry, it is totally impossible that free hydrogen and free oxygen can meet without specific union of the two, which chemistry tells us takes place.

Here, then, we have at once the source of those immense quantities of inorganic fluids used in the system for mere lubrication. We cannot admit that any elements in the body can remain long unmixed with others. Their natural caloric must cause condensation, inspissation, and union with everything which surrounds them or will combine with them. We may naturally infer, then, that certain quantities of fluids so largely made, and in health being in a surplus quantity to what is actually required, that they would become condensed; and so they do, and it is from this source we have fatty deposits. Some portions of the oxygen being lost, and carbon combining with the hydrogen, we get hydro-carbon, or carbo-hydrogen, just whichever chemists choose to call fat. It is thus that I con-

sider how this singular inorganic structure we know as fat is formed. Yet when it is formed it obeys similar laws to all other deposits by having its matrix and fixed places. Otherwise it would be a wanderer, instead of a stationary substance. This is also shown by the fact that wherever it is deposited it is protected by an organic investing membrane. This membrane, as any one may see, is supplied by small arterial vessels, through which it gets its organic bases, whilst from the fat which it encloses, it obtains its inorganic diluent, without which it could not be supported.

Fat is used in the body in various ways. What physiologists have said about it is very small compared with its real value: besides much being untrue. I believe it is admitted that during life and full vigour fat is a sort of oleaginous fluid, and only after death does it become the more solid substance we see. What can better illustrate its use than calling it the oil-can of the body? Look for one moment where it is, and where it is not distributed. It is wanted more at certain spots and places than others, and in some it is not wanted at all. We cannot carve a joint of meat at our tables without seeing it encompassing muscles and dipping into them, and always at the largest parts. We cannot suppose for a moment that the chemical alembic of the body can fail to separate from this animal oil the more aqueous portions and use them as lubricators, and even filter the more unctuous properties at one time and another through all structures and between all fibres. Indeed, the fat is not only the great oil-can, but the great filter of the body. Physiology has spoken of the combustion of fat in the system for vital as well as for calorific purposes. For my own

part I do not give so much credit to this doctrine, or put it on such a par, or species of chylopoietic digestive process. I don't think it is just. If people have at times lived upon their fat for want of food, or if the hibernating animals go into their dens and lairs 'fat and well liking,' and in the spring come out thin and lean, I may yet doubt our physiological dogmas about combustion. No doubt their fat is consumed; but I believe it to be used only as a natural filter to supply to all their muscles a moisture they could not get anywhere else in like proportion, though they still get some from the simple union of the hydrogen and oxygen gases. Fat, however, is a great reservoir; one instance alone would show this. Look at the great quantity of fat round and about the heart, and then reflect on its many muscles, a perfect network as I have previously said. This organ could not act in the hibernators for so many weeks or even months without this oil-can, which gradually, like all other fat at other parts, becomes much exhausted, but never lost. If we are to consider that the blood in the arteries and veins is precisely of the same character and quantity during the time of hibernation, why do they not at this, the greatest need of the body, furnish fat as they did before, according to received opinion? The answer is, simply because the blood never did furnish it, and never can. We do not want an alderman to tell us of the succulency of the meat or muscles of well-fatted animals. Nor do we want his testimony that the muscles of lean animals are tough and fibrous; yet these animals may have just as much blood in their thin as in their fat state. The simple fact then is, that it is not from combustion at all, that fat produces life

powers. It seems to me to be the very opposite, for fat appears to be produced by combustion, carbonisation, and inspissation of the water, which the gases have first made, and when fat is so stored and no more made, it resolves itself by a gradually liquefying process into a watery extract for the mere purpose of necessary lubrication. The very principle of training for great muscular feats has its solution in this fact; which is simply to reduce the formation of fat and to use up excess by first liquefying and then sweating it out; and it has always occurred to me that in the high vigour in which we get our racing and hunting studs, whether of dogs or horses, or even ourselves, is founded on this principle,—to have enough and no more. That this vigour is enhanced by a greater percentage of fibrous elements throughout the whole arterial circulation by which greater powers both of strength and endurance are obtained,—a condition so rich in every element that one would suppose, if physiology was right in saying fat was a product and deposit of blood elements, that it would then be more, instead of less.

View the subject in any and every way, fat being a deposit or a formation from the blood is a magnificent fallacy. Let us at once consign it to the philosophy of error.

Fat, then, is an inorganic mass or structure, having organic investing fasciæ, which are supported by blood deposits the same as all other structures, and having powers of contraction and expansion. In fact, it is the skin of the oil-can, as much so, and as useful to it, as our external cuticle or skin to expand and contract with size. It incloses and envelopes the storehouse of inorganic fluids which is ready at all times to supply

the deficiency of those other inorganic fluids made directly by the union of the oxygen and hydrogen gases, should they be at any time deficient. Thus, by the contraction of its investing membranes, while the fat is in a fluid or oily state, its more aqueous elements are expressed, and act as lubricators to the fasciæ of or to the skinny layers between the fibres of the muscles themselves.

Fat is more readily made and retained in some idiosyncrasies, than in others. It is exhausted rapidly in certain diseases, when the system may be said to be in drought, and then the great fluid streams, both from itself as well as the fresh made ones, are dried up. It must always be present, as the bedding and resting-place of glands, to furnish the blood secretion of these organs with inorganic diluent fluids. It is everywhere placed where it is most wanted, and does not exist where it is not. As it supplies the aqueous portions of the glandular secretions, it is most largely deposited about the kidneys to do the same as an exhalant for the organic elements deposited by the blood in these organs, and becomes in these parts one of the greatest filters for excess of inorganic fluids in the internal organs. It thus regulates them in a most beautiful and marvellous manner. For when evaporation from the surfaces ceases from natural or climatic causes, the pelves of the kidneys and then the bladder receive great quantities of inorganic fluids from it, with a very small amount of urea or other organic elements from the blood.

XII. What are the processes of digestion, and assimilation of new ingesta? and how far do they assist the views I have hitherto held? and what characteristics do they offer, or how differ from one another?

On the first of these questions, physiology has, no doubt, formed correct theories; still I think there are points worthy of consideration, in addition to all we appear to know and believe. There is no doubt of the stomach being an acid alembic, and probably, between its muscular and muco-membranous coats, there exist organisms and structures not yet positively defined, to which are given the duties of secreting the gastric acid, for in no other organ is this done.

In examining well-prepared tripe, between the laminae of which structures are evidently visible, which no other intestines have; we know that portions of this, called rennet, are used to curdle milk, and that a fashionable remedy called Pepsine is manufactured from the same. The quantity of gastric acid generated in the human stomach is something fabulous, and leads to the thought, how the mucous membrane of that organ can endure the constant influence of such a destructive agent. I am certainly inclined to think that no other mucous membrane could do so. Therefore we have a right to believe that mucous membranes variously situated have a different degree of capacity, power, and usefulness, very distinctive from what we are accustomed to consider. Any physiologist of any intelligence must have seen how much evil arises from bile regurgitating into the stomach, showing that it is not a structure fitted to receive excess of alkali. On the other hand; could the mucous membrane of the duodenum bear the action of those acids, which the mucous membrane of the stomach is always subjected to? The chyme, flowing as it does into the duodenum at once, has its acids neutralised and oily fatty matters saponified by the powerful action of the bile. Here,

then, we see an acid alembic pouring its unassimilated mass into an alkaline alembic; the lining and coats of both being apparently of the same character, yet in their physiology and capabilities widely different. Some may say that this is from habit or mere usage. I cannot go so far as this, for I am inclined to view Nature more rationally, and what some men might ascribe to accident, I would ascribe to law. Take the next stage, the mucous membrane of the small intestines. Could acid digestion take place in these as in the stomach, or alkaline reaction as in the duodenum? I fully believe it would be impossible, because the laws of action of all three cavities are totally different, as different as their three separate uses. The action of the stomach with its secretions are different from that of the duodenum; while the action of the small intestines differs from both. The true physiology of the small intestines has led to the adoption of the term '*vermicular*,' or, '*peristaltic action*.' But I apprehend this only exists in the small intestines. The true action of these seems to be, that their sides should be always in apposition and by a combined process, from the first chyle entering into them to the last act of expelling the more solid portions, to press the fluid humoral parts into the membranes, through which they are conveyed by endosmose into the absorbents, lacteals and even recurrent veins. At one time, 'the mouths of the absorbents' were freely spoken of, as if the chyle had only to pass through the small intestines in the most negligent way, and have its goodness extracted by these openings. To the credit of physiology this is exploded, still I never could conceive how the matter to be elected could be taken up unless some mechanical

means was used to ensure its being done. The constant apposition of the sides by a moderate millstoning or washerwoman hand-rubbing process, appears to me to account at once both for the means of pressure as for the peristaltic action. But let us follow the membranes. At the ileum the more solid constituents, from which no more useful fluid can be extracted, begin to take on the fæculent character, and more so directly the mass enters the colon until the sphincter ani is reached. Now, could the membranes of the small intestines, duodenum and stomach, bear for one moment the stinking evolutions of the fæces? The stomach has antiseptic and deodorising properties, as witness the sweet breath after a meal, previously much tainted. There is scarcely anything edible, even of the most putrid character, which man in his highest state may not take in the form of game, or the cannibals in the form of their own fellow-creatures, but the stomach and its juices can deodorise and sweeten. We know that the foul birds, after eating carrion, can disgorge it free from taint. But no membranes but those of the colon can retain fæces or tolerate them in any way. The same again with the mucous membrane of the bladder. See the caustic action of the urine on the skin and the nates of infants whose napkins are not properly changed, or the bed sores produced in neglected patients from the same cause. Could therefore any mucous membrane of any distinctive part perform the duties with impunity of another, when we have seen by this brief sketch how different the elements are which lie upon them? If this is so, their substance must also differ in many respects, and we have organs and machinery appointed in every given place for the

performance of certain duties, which they alone are capable of doing.

Taking, then, this rapid sketch of the alimentary canal and its different parts, and admitting all that physiology says of the various duties and gradual co-operative uses of them all, in the disintegration of raw material of every sort and kind, we find two great facts: namely, that not only gases are received in quantity, but generated in quantity also, and escape by exosmose. That not only the stomach makes a large amount of free acid, but the liver pours into the duodenum large amounts of free alkali, while the membranes of both organs are most active. That the small intestines squeeze out the humoral portions of the chyle, and press onwards the solids, and make at the same time much secretive matter from themselves. That not only gases are pressed, or are radiated, from all these during their active duties, and that during their passive ones they absorb them into themselves, and create a union with what they find, both of a fluid and gaseous character, and these again uniting, furnish these parts with passive agents. Hence it has been noticed by physiologists, with no little degree of wonder, that when patients in certain conditions of disease have not taken foreign aliment to any extent or character for some time, shall yet have faecal actions on the bowels, leading to the term, 'Oh! there is always something there.' We have a right, then, to consider the alimentary canal in another light, and compare it to the skin, in so far as it may be called the external tegument of the internal organs to receive all radiated matter, gaseous or fluid, on its surface, absorb it into the alimentary tract, retain it,

and use it for specific purposes, even conversion into fæces. This is in contradistinction to the skin itself receiving from all its subjacent parts, gaseous and aqueous elements, but radiating them into the atmosphere. Therefore, I have just cause to show, that every cavity throughout the alimentary canal has its own physiological laws, and that each differs from the other according to the duties it has to perform.

XIII. The last intestine of the body is a sink for faecal matter. If we ask the question, what are the true duties and uses of both intestine and contents? we are asking that to which no true answer has ever yet been given. What my own views are I will endeavour to express in as few words as possible.

Its anatomy at once discloses a fact, that it is a great field, and shows a marvellous adaptation to great ends. If nature had no further use for the fæces when she cast them into the cæcum, which is not above three inches from the anus, she would no doubt have made a short cut out, and so got rid of them. Why not? She could have provided for man's civilised state by retaining them to suit his convenience. But having made the colon of such a length and range, as well as portions of it to rest on and be in apposition with every abdominal organ, would imply some wondrous end, even if we have not discovered it. Instead of having any peristaltic action, like the small intestines, to hasten the passage of everything through it, it has the very reverse, for it offers every obstruction to the passage of fæces, from the first moment they enter it, to the last act of passing out.

For some years I have looked upon the colon, throughout its whole length, as the combined 'scape-

movement of one of the most perfect pieces of machinery that Infinite Wisdom could devise, without which man would not be what he is. The manure or fæces herein contained may be said to be analogous to that which the agriculturist puts upon his land, for without manure he would get no crops; neither should we.

Whatever gases are evolved elsewhere in the whole body,—and I have represented them to be very large,—bear no comparison to what are generated in this natural gasometer. Here the manufacturing process is so great and the gases evolved so large that they resist by their own exosmosis the presence of any others, externally generated or present in the system. Here hydrogen, sulphuretted hydrogen, phosphoric and phosphoretted hydrogen—in fact, all the most volatile and at the same time most useful and most poisonous—gases are made. They make man himself one of the most active poison generators in the world; nor could he exist unless this was the case. No oxygen has a chance of getting into the colon in its integrity. It is to the rapid union, formation, radiation, and exosmose of these gases that vitality is kept up in its highest state. The largest portion of the gases which resist the atmospheric pressure is here manufactured. It is to the hydrogens here generated and so readily escaping by exosmose, and permeating every structure, that we are indebted to the large quantity of inorganic lubricating fluids of the whole body. The rapid union of the hydrogens with the oxygen make large amounts of inorganic aqueous fluids; whilst to their union and their combustion with carbon, we owe the formation of fat by inspissation. It is to the phosphoric acid gases that we owe our brain power, especially the reflecting portions. It is

to the sulphuretted hydrogen we owe our immunity from eruptive diseases. It is to the combustion of all these, and their prolific and wonderful union, that caloric is so largely produced, independently of any other source, and that the fluid elements of the body are maintained at a given temperature. It is to the wise laws which rule over and govern all these that make man the varied being he is. It is to this intestine and its contents that the different idiosyncrasies of men are due. It is to this, and to these more than anything else, that our forms and shapes are so different and our minds so varied. It is to those laws which regulate the size of the colon and to its energetic actions, with the ready evolution of the gases and as rapid passing out of fæces in due proportion, that our stout and fat people derive all their consistence and substance, even to excess. It is clear they have more fluid, and, having this, inspissate more fat; having these, they get excess of caloric, which is more easily and readily excited to perspiration externally, and consequently a greater absorption and condensation of effete matter into the general alimentary canal. Equally clear is it, that those whose colons are small, narrow, and contracted, are thin, and are generally conserved or constipated in their habits.

Thus, then, it is seen that a perfectly opposite idiosyncrasy is produced. Unless this conservatism happened, they would suffer in brain power; but Nature is too wise to allow the gift of reason to be tampered with, or to fall short in any varied idiosyncrasies. Thus we see that when there is excess of gases, they make substance, and that substance is fat. Where there is not sufficient to make excess of fat, the gases

are still sufficient to make enough to supply inorganic fluids for the fibres of muscles, as well as for the glands to dilute the organic elements of the blood supplied to uphold structure. In both instances the brain power is never neglected.

Here, then, is one of those marvellous adaptations to wonderful ends, that Nature should regulate the actions of the bowels to the individual necessities. Hence we have idiosyncrasies whose health depends on having a daily or bis-diurnal evacuation of fæces; and idiosyncrasies whose state varies from one day to even thirty or forty days, to get even life or any health at all. In every idiosyncrasy, the natural act of its healthy colon regulates the supply of the gases of the body. Thus, in those who have their daily evacuation, a conservatism may arise for a specific purpose, and in those who have these evacuations delayed, a looseness may arise. In both instances, if let alone, they are in each the *vis medicatrix Naturæ*, or that power which has always been on men's lips, but never understood, simply for want of knowledge of natural laws. Nor do I rest here. The colon sympathises with every abdominal organ, perhaps more largely as a single individual than any other does in so distinctive a manner with its neighbours. Being the greatest gasometer of the body, and its gases resisting as they do those of the atmosphere, we find the action of the colon regulating all these in the system, in the varied positions and circumstances in which each individual may be placed. Hence we find most singular actions of individuals and their idiosyncrasies. A man and his wife shall be perfectly well in their London residence. At their country-house in Surrey, the wife is not there twenty-four hours before she has a diarrhœa, which lasts the

whole time she is there, and she is obliged to go back to town. Her husband is equally well there as in London. They have business which takes them to France. Directly they step on continental land, the wife feels even better than she did in London, and the husband not so well; but directly they get to Paris, the husband begins to suffer with diarrhœa, which lasts the whole time he is there, while the wife enjoys the highest degree of health. These cases of individual idiosyncrasies and the effects of certain localities upon them may be cited *ad infinitum*. There is not a medical man in Europe, perhaps, who could not record instances of similar character, the most varied and curious. Indeed, why are individuals ordered to various climates, not only from those which do not suit them, but from those which do; as they may require some change at some important alterations in their systems? What has the Faculty ever said? ‘Oh, it is the water;—it is the diet!’ in fact, it is a thousand things, they say; but not yet apparent to our present limited knowledge of physiology. All that they do, or can do, or that is left them to do, is to stop the diarrhœa on the one hand, or to regulate the bowels, or rather try to do so, on the other; or else endeavour by dietetics to gain some medium status to the system. Yet in all these matters they often fail. Unless, then, we give to the gases greater consideration than we have ever yet done, and unless we more deeply consider their origin and uses within ourselves, the subject will be for ever our reproach.

The colon again is a most discriminating organ. It is not only that, but it seems to me to be endowed with instinct. With some it takes everything with impunity that in the course of the alimentary process

can be sent into it; with others, it acts with great discrimination, and will not have it. The transverse arch is so intimately connected, and so highly sympathetic with the stomach, that it causes that organ to reject elements it has received; and there is not a more beautiful act in the system than this; so much so, that I have looked upon sickness and vomiting as a pure colon symptom. Hiccough, sneezing, and some other affections may be stomach sympathies, but sickness is a colon sympathy *par excellence*.

In the early months of pregnancy, it regulates the quantity of fæces that shall come into it, by informing the stomach that it not only does not want them, but will not have them. So the stomach is made to disgorge its contents, yet only perhaps to a certain extent. While it digests portions of diet, and transmits into the duodenum a given amount of chyme, and allows the more solid mass to pass through the pylorus; yet having received an intimation from the transverse arch of the colon that no more must pass—what is left behind is then vomited from the stomach.

If this were not the case, one of two things would happen: if excess of fæces got into the colon, excess of gases would be made as a sequitur; or, when there, and in order to prevent this, a natural diarrhœa would result, which would weaken the whole system, as diarrhœas always do. Therefore, this perfect understanding between such important organs as the stomach and the colon is regulated by the stomach succumbing to the dicta and laws of requirement of fæces in the colon and the gases needed by the body generally. The natural consequence of these sympathetic sicknesses is conservatism of the fæces which are in the colon;

consequently, that bugbear to all concerned occurs—namely, costiveness, which has given as much trouble in its way to the whole body of the Faculty as any of the great diseases to which the body is liable. Yet it appears to me simple enough from my standpoint: that Nature prefers the gases generated from these conserved fæces to those which would be evolved from too often supplied fresh ones. Therefore, it is quite new to science to say that it is evident that the different manuring of the human forty-acre field, for the due evolution of gases for crops, should be equally studied, as the agriculturist studies what manure will best suit his different fields. The agriculturist does not manure to add humus to his soil; he manures to get gases. A field which has produced its crops several times a year and correspondingly manured is, after twenty years, not an inch higher. But if all the manure in that time had been placed on one spot, a heap as high as the Monument would alone show the quantity. But disintegrated and ploughed in, it becomes lost by the effect of the rains, and decomposition resolving all into the natural gases useful for the seeds and plants therein placed, the tendrils of which absorb them. So it is with the human manure. It is all very well for physiologists to speak of some constipated or conservative habits requiring a longer time to combine and absorb nutritious matter. In this they rather infer that digestion is delayed in the stomach and duodenum, or that appropriation and absorption is retarded in the small intestines. It is no such thing: an equal rapidity of all these first processes may take place in those individuals who have conservative actions of their colons, as with those who have actions on them daily or oftener. The one class may eat and drink as varied matter, as

great a quantity, and as often as the other. Therefore it cannot be in these, that the phenomena of different habits are to be considered. It is to the proper and due distribution of the gases formed from the manure in the colon, that all the physiological inferences are due. To bring the habit of the diurnal faecalist into that of the one who has delays to any amount of time, would induce disease; and it is just as bad to attempt to bring the delaying colon into the state of that of the diurnal faecalist. The great sympathy of the reflecting portion of the brain with the colon, is one of those points which have sadly escaped a true definition, and led to many errors in the administration of purgatives. Frontal headaches may occur if the diurnal faecalist misses his daily evacuation, and therefore it is inferred, that this act should be enforced, or the head becomes affected. The same, however, may occur in him who, being conserved in his habits, gets actions on his bowels oftener than he is accustomed to have them; nor does he recover from them until his usual habit returns. In all brain attacks, actions of the bowels are enjoined, because it has been seen that the head is affected in one idiosyncrasy if they are not; but the reverse has never yet been considered in the light I have now placed it. I can say, as the result of a thousand cases, that in the delayed faecalist, excess of actions, either naturally or artificially produced on the colon, are the fruitful sources of softening of the brain. The one class, or diurnal faecalists, have always elements in excess, rather than being deficient in them; and Nature in her faeculent department moves away that which she does not want. The other class, from some ill-understood fact, retain the faeces in

order to get those elements; but should the fæces be in this case removed, and those elements in consequence become deficient for due vital integrity, it leaves the sufferer with greater disturbance. The true principle in this latter case is to supply the elements artificially which Nature endeavours to obtain from her one only source, and it is curious to see how wonderfully she will instantly absorb them, and let go her hold upon the fæces. Thus that which would have been a decided element to constipate the regular fæcalist actually relaxes the hold Nature has on the fæces of the delaying person. The powers which Nature gets from the fæces are wonderful to contemplate when once they are known. The damages which are repaired from this source in accidents of almost every kind, and the diseases also which can alone be cured from them, have not yet entered into the physiologist's calculations. Well may he, then, wonder at what he terms the *vis medicatrix Naturæ*, if he has at any time thought of the varied idiosyncrasies of individuals, who have in both states in all their variety unconditional good health! Let him pause and reflect how a more perfect understanding of the treatment of the body will redound to the credit of his order, as regards these facts in disease. Let naturalists also consider these facts more closely, and not attribute to wrong sources the growth of plants or trees. Moisture may be and is absorbed by them, and oxygen is admitted to do so to a large extent. But let them consider how much the gases absorbed by the roots and tendrils, and those which they make within their own structure, mixing with the oxygen, form the greater portion of their fluid structure. All these, in their due course of condensation and in-

spissation with the peculiar elements of the various species within themselves, make their solid structure: from the rose, the dahlia, or the daisy, up to the oak or *Wellingtonia gigantea*. It is not to things that nourish all these different species, that we owe their varied blooms, flowers, seeds, or species; it is to what they make themselves within themselves. Thus they may absorb moisture and oxygen from the atmosphere, and other gases from the humus of the soil. All these resolve themselves into many various elements: the fluids into gases, and the gases into fluids. These latter in the flowering stage are resolved into gases again, which give to each, according to their species, their different aroma. Where plants or flowers are scentless, they are deficient of that matrix which converts the gases in their last union into a scent. Thus we may increase by culture the aroma of the scent-giving flowers, but cannot give by any culture a scent to those which have not the scent matrix. Albumen is an essential element of the cereals, and when vitally active, nourishes, and when dead undergoes putrefaction. The serum of all living plants and animals contains albumen largely. Albumen, sugar, and fat are nearly allied; hence we find the olive and other species producing oils and sebaceous substances, by the same laws that animals produce fat. It is not from the true sap of plants, nor from the blood of animals, that fat is made, as I have shown. Nor do we owe either directly from the blood itself or from foreign ingesta our physical or mental qualifications. These are products of the laws of matter which we generate and make within ourselves. Numberless flowers shall live and grow in the same border, and be subjected to the same treat-

ment; but how different their own internal laws! Therefore it is to these we owe the speciality of their genera. The same with ourselves. Men may live in the same way in every matter as to diet and atmosphere, yet how different are their thoughts, and the variety of their attainments, tastes, &c.! These are our crops, developing our flowers; and consequently we never find two persons precisely alike; simply owing to the different arrangement of elements within themselves.

To the colon so much is due, that even what I have already said of it is not a thousandth part of what could be said. We owe to it the moistening streams of life, for when they are in excess we fatten and get sleek; when in their medium state we get a condition between extreme fatness and extreme leanness; in fact, that condition fitting us for any amount of wear and tear of mind and body—in short, what is termed ‘being in good condition.’ When the streams are low, we have leanness; yet with an idiosyncrasy of wiryness and endurance. In the redundant state we often deposit these excesses in the form of fatty tumours and excrescences. Nature, overdone by excess of these vital bounties, rids herself of them, more often by diarrhoeas or eruptive diseases; thus making use of the abdominal canal to carry off from the internal structure excessive vital power, which gravitates or gets by endosmose into this tract. While the skin, on the other hand, being an exposed instead of an enclosed organ, is made the medium for conveying through the surface by exosmose excess of other vital elements, which cannot get to the alimentary tract. These assume all the variety of eruptions, from the dry or scabby form to the most intensely pustular, such as small-pox, &c.

Thus Nature, overstocked with vital matter, gets rid of it, and both these acts may be called, on the one hand, her power to cure herself, or on the other her natural counter-irritation to relieve the system of what vexes her. Thus man only imitates her by his counter-irritants, such as blisters, &c., in all their variety. In fact, all disease, of whatever kind, is only Nature's attempt to relieve herself from some elementary disturbance. On the other hand, when the inorganic streams, which in excess make supervital actions, are dried up to some extent, we find excess of the structural elements, and consequently arterial engorgements, known to science as inflammations. Fevers are then set up in all their endless variety. Now, in these states we do not see any of the papulous eruptions, nor any such natural counter-irritants; because we have now deficient vital power. In both these extremes we can distinctly see the *vis medicatrix Naturæ*. In the first, excesses or redundances of vital powers are carried off by eruptions or diarrhœas,—both of them crises in their way; and the system, if judiciously treated, and Nature assisted and not run counter to, gradually attains its equilibrium of health. In the other, as soon as Nature can restore the inorganic diluting fluids, and set afloat again in the system all her beautiful springs, rivers, and lakes to mix with the too fibrinous and organic structural elements, and so raise her powers of vital action once more;—then an equilibrium again ensues.

Who has not stood by the bed-side of fever and not remarked the singular constipation of the bowels as a physiological phenomenon, and not asked himself the reason of this? By the laws I have stated, all the

moisture has been absorbed from the fæces, and Nature is now retaining even the scybalæ to get all the hydrogen she can from these remnants, and even all that she can get from the strongly impregnated membrane, which has so long been in contact with them. It seems scarcely of any use for the patient to drink, let the quantity be ever so great: it seldom lessens, except in the most temporary manner, the thirst or dryness of the whole body; yet it does good, it must do good, by moistening the membranes. But the fluids are soon converted into their separate gases, with oxygen in excess. Here, again, this gas performs its wonderful oxydising ends, and wears the system to exhaustion and tenuity. It robs the fat of its hydrogen, for how soon the patient emaciates and loses it! If the bowels are let alone in their truthful action of conservatism, some reaction will take place, obeying a periodic law at the subsidence of the fever. Both these depend on the returning act of the generation of hydrogen in sufficient quantity to unite with the oxygen, and make again the inorganic fluids I have already spoken of, as being deficient. When this ensues, the thirst begins to abate; the kidneys to act; the fixed caloric or dry heat is not so great; the bowels gradually act of themselves; the patient begins to express a desire for fresh aliment, in order to make fresh fæces. These furnish the hydrogen in proper quantities as before, and a perspiration is seen gradually moistening the exhaling pores of the skin. In fact, the old routine is again set up; Nature is getting into the groove of health, and we see daily, even hourly, an improvement in every condition. What is this but the *vis medicatrix Naturæ* better understood?

I have watched this process scores of times, and can come to no other conclusion that seems so satisfactory. Our fevers, our choleras, and our epidemics generally, are sad bugbears, and stumbling-blocks to our fame. As I have said before, knowing so little about them, we are content to go with the public in all matters of prevention. 'Fever dens' are upon every one's lips. Lodging-houses are sought out, and only a certain number of persons permitted to inhabit any given number of cubic feet. Here is, at least, an admission by everybody of the value of oxygen gas to the system. But the reasoning is continued in the same strain; that the air of a room, inhabited by a certain number of persons who do not get this quantity, becomes poisoned. Now from whence does this arise, but from the people themselves? Not only their own exhalations produce a mephitic atmosphere, but they breathe this over and over again, until their systems are in a condition to generate any disease, and when it has, it is said to arise from want of oxygen. This is true in one sense; but if each individual makes all the poisonous gases I have set forth that he does make and must make for health, and these getting in excess, I should be led to say that each single system is poisoned by its own self-generated secretions, which have not had the due and proper amalgamation of oxygen to form aqueous and other elements. Granted that *if* there had been sufficient oxygen to prevent the condensation of the poisonous gases in each case, it simply proves that it is not so much the lack of oxygen as the excess of hydrogen, and all its combinations, which has been the true cause of the individual or individuals breeding disease. Considering the lives of

the spirit drinkers of the lowest classes, and the amount in excess of poisonous elements which they generate within themselves, it is not to be wondered, that they can resist the atmosphere in the way they do. About the neighbourhood of London there are many houses with small gardens with a few shrubs before them. Here one of these drunkards will slink like a beast to his lair, and lie down on the wet ground on one of the wettest nights; a bundle of stinking animal matter and rags. He absorbs the moisture from the ground, for in the morning it is seen that somebody has lain there; for it is dry. He absorbs the moisture and oxygen from a bountiful atmosphere which, in a great measure purify his own, and he has radiated the foulest odours from his body which the human mind can conceive. He gets up at the first dawn, shakes himself and looks about, to enter the first gin-shop that opens. Nothing short of such a bed, in such an atmosphere, could keep him from disease. Had he lain in a barn, large as it might be, he would have polluted it. How much more a small apartment with the scientific quantity of oxygen! even that he would have poisoned for any one else to exist in, in the opposite condition to his.

Thus, then, I wish to show, that the greater percentage of these fever cases, arising from these fever dens, is due to that which is generated by the individuals themselves; whilst, on the other hand, it clearly proves that it is not alone that the oxygen which is required as oxygen, in the sense and limited extent that science has hitherto considered it; but that it is wanted to unite with the natural poisonous elements we all make, particularly the hydrogens, and to be

converted by their union into revivifying streams; without which we see clearly, and in these cases especially, how fevers are manufactured. When fevers come with every attribute of plenty of oxygen,—and this excuse cannot be made as it is with the fever dens,—then it is that my views are shown more clearly, and that it is to our own self-generated gases we owe them, and it is to the do-nothing principle, but leaving them to the *vis medicatrix Naturæ*, that they get better; for which credit is taken by the Faculty for TREATING these diseases better than formerly.

The state of the colon varies at various stages of our existence or altered habits, and regulates our very length of days, our necessities, and even happiness. As age creeps upon us, and if we have been diurnal fæcalists, we somehow do not like this habit interfered with. Now this is often the case with literary men, who, after they have turned three score, and the next half score is coming gradually upon them, finding them still at their literary pursuits, they complain that their bowels do not act so regularly as formerly. Bound, however, by the dogmas of schools, they seek all the small aids that laxatives can give them, in addition to dieting. Along with this very annoying state of conservatism, they complain of their memory, which is now playing them false, and which diminishes in the proportionate ratio to the habit of physicking themselves. There is no class to which this fact comes more home, than to old medical men and physicians, who have been bitten with the *cacoëthes scribendi*. They will not allow their bowels any conservancy: they never admitted it in their writings; they never allowed it in their patients; and they will not permit

it in themselves. Thus, never having known the true physiology of the colon, and never having conceived the value of the *fæces* AS *FÆCES*, and never divined the great sympathy there is between the colon and *fæces* and the reflecting portions of the brain, they serve themselves at last, as they have served a thousand others, most unfortunately. Now as their own time comes, they lessen their physical and mental powers by injudicious laxatives; first weakening the one, and then destroying the other, and so they drop away from this earthly scene before their time—martyrs to a myth, and unbelievers in the art they have so long practised, simply because another page of the book of Nature was not turned over in their time; but even if it had been, their prejudices could never have succumbed to what they would designate as mere fiction.

Let me, then, put in a plea for the COLON AND THE FÆCES, and through these establish the great fact of the equal value of the gases of the body, to the solids and fluids.

XIV. Can the blood do all that physiologists say it does? I am bold enough to say it cannot.

In the first place, there are many parts of the embryo of animals which are made before the heart or even the blood are in existence. This is apparent in the incubation of the chicken. In the first formation of blood currents through structure, a species of pushing forward process takes place, similar to what must occur when these have been destroyed by wounds, &c., and fresh channels are formed. Therefore we have as good a right to say that if so many structures are made before the blood, that when all the circulating vessels are made and carrying blood, yet there are

elements within us, which make similar substances without the blood, as they did before the blood was made. I look upon the arterial blood in pretty much the same light in comparison with all other fluids in the body, as the bones bear to all other solids, namely, as a great supporter and upholder of them all. But comparison cannot go beyond this point. If, then, from what I have previously stated, we give to the arterial blood its due use, character, and importance of carrying in its stream the bases of many structures, I think we then give it quite enough to do. We evidently derive the basic elements of all glandular secretions, as well as of the structural organs, from this source, whether they be solids or fluids, from fasciæ, muscle, cartilage, up to bone itself; all which basic elements are kept dissolved or held in solution by an appropriate inorganic fluid. Chemistry has long since shown this to be the fact, and that the actual material of the blood for the purposes above described only amounts to about 5 to 8 per cent., the other 95 or 92 parts being merely its menstruum. Nature, therefore, has as much to do to keep up the due proportion of menstruum as she has the basic elements. It is very evident to every one who has seen much of disease, that the organic or basic elements of the blood vary very much, in anæmic people, in hæmorrhagic people, from natural causes and in those who have lost much blood from accidents, ruptures of great vessels, &c. We yet find the duties of life going on and vitality sustained, and even anæmic and hæmorrhagic people getting fat and often obese. But in the healthy condition, nature has to keep up a due balance of both organic and inorganic elements in the blood. Her

employment of absorbents to bring back into the circulation all the decomposed and animalised vital structures, and receiving from the chyle elements of new matter to invigorate these, illustrate the fact of a double purpose, namely, to get a fresh organic basis conveyed in a due proportion of inorganic menstruum. Wherever the organic bases of the arterial blood are deposited, there will always be found at that spot inorganic elements to mix with them from other sources of supply; whether these bases are to be used again in the system as in salivary glands, or carried out of it as effete and useless matter as in the kidneys. How could these salts of glandular secretions be used, and how could the urea and other urinary salts pass off, unless they were so diluted? To say that the blood can spare both basic elements as well as menstruum, must surely be a grievous error. The very fact of the veins being ready to carry away the menstruum in which these salts were mixed, proves that it was wanted elsewhere, and that the organic salts themselves found other fluid elements to unite with. I do not therefore disagree with physiologists who say, that many of these acts of extracting the basic elements are performed by the capillary system, because it is a provision of Nature to connect the terminations of one great set of vessels, which contained the greatest amount of organic properties, with the commencement of another great set, to carry away the menstruum after they have been deposited at their appointed places. It does therefore appear so clear that this menstruum could not be spared or given up when the basic elements were extracted from it. If it was true that all saliva and all other great glandular secretions were both in

their basic elements and fluid menstruum eliminated entirely from the arterial blood, it would be equally true that we should not require veins at all. Therefore the capillaries may be points from which the greater portions of the organic elements are eliminated, and are so constructed that they should carefully guard against their escape along with the menstruum, and I do not know a prettier means to an end. The menstruum, thus freed from its organic constituents, becomes an inorganic fluid, but in flowing onwards through the veins, which act as absorbents or have absorbents entering into them, receive much organic matter from the body before reaching the great terminus. When this is gained, it is a fit menstruum for the chyle, which is a compound of organic, as well as inorganic matter. Nevertheless, this combined stream, being imperfectly mixed, is received into the right auricle of the heart, where the first amalgamating process is performed; then into the right ventricle, where a second amalgamation takes place. It is then sent into the lungs, where such changes occur which give it its vital character. But here, as changes have again happened in it, and the second mixing somewhat incomplete, it gets this partially performed in the left auricle and perfected in the left ventricle; from whence it is sent by hydraulic pressure on the one hand, and by the attraction of vacuity on the other, to all parts of the body. I use the term *attraction of vacuity* to express an act which must evidently relieve the heart and make its work less difficult. Believing, with some physiologists, that a vacuum may exist at the capillary terminations at a time when the organic elements have been parted from, and the venous current commencing.

Thus atomic attraction in the veins would evidently assist the vacuum produced. By these means a continuity of streams is kept up, which otherwise, without these beautiful imaginary assistances, in the absence of actual knowledge of the facts, might not be so perfectly regular as we see they are. If, then, we give to the arterial blood the duty of only supplying basic elements for all structures and for all secretions which are used again in the body for vital as well as chemico-vital purposes, I do think that we fairly give it all that it deserves, or all it can possibly do. And in the review of even these facts it is most wonderful and enormous.

If we take the *vis medicatrix Naturæ* from a surgical point of view, and say, here is a sudden most severely combined incised and lacerated wound in a fleshy part, with no great vessels destroyed; physiology, knowing the curative action of natural secretions, binds up and approximates the parts as much as possible. Some of the incised portions heal by what is called the first intention; the others, having become partially destroyed, slough away; yet in course of time all is found grown up, and natural cicatrices only mark where the injury has been. Now physiologists are not true to themselves, if they attribute all this beautiful reconstruction, reformation, healing, &c. to the blood alone. It is not just to Nature, to lay to the action of the blood alone all the phenomena here witnessed, nor is it creditable to any observer; for when all bleeding has ceased, we naturally infer that all the cut and wounded blood vessels are stopped up. But then we see immense discharges taking place, and as these do not and cannot come from the blood, they

must be produced from other sources. For instance, the muscles have been incised, consequently a very large amount of the natural inorganic fluids which lubricate their countless fibres, ceasing to gravitate to their accustomed places, converge here; and as all the upper and lower parts of these muscles must be kept supplied by their natural lubricating streams, fresh fluid is always coming in. Then many of the absorbents, lacteals, and lymphatics, being active at their sources, yet divided in their currents, naturally deposit a large amount of their contents at this spot. Oxygen gets into the open structure, and performs its decaying and oxydising action, but, at the same time, finding hydrogen, unites with that, and more aqueous elements are formed, aiding the disintegration of the solids, which have been destroyed, but which again assist the process of sloughing. Here often lies the danger to the patient. Unless the surgeon provides *amply* for the discharges of putrescent or poisonous matter, all of a non-vitalising character; but, on the other hand, as I have too often seen, shuts the vents up too much; these poisonous elements are taken up by the absorbents; then we have erysipelas, hospital gangrene, pyæmia, with all their accompanying disturbances of hectic fever, and, what are erroneously called, '*blood poisons*.' As if every other element besides the blood, organic as well as inorganic, was not equally poisoned,—yes and more so, for these, as I have shown, are the natural diluents to the blood, and 95 per cent. greater in quantity, and so are poisoned in proportion.

In the reconstruction of new matter, it must always be borne in mind, that an excess of everything to perfect every part is absolutely necessary. Some of which,

however, may not be required, and so escapes through the opening along with the non-vitalised elements; the necessary quantity only being taken up. This goes on until Nature's carpentering is perfected. So that on review of every repair of wounded structure, whether large or small, we find the inorganic elements from all the muscles and their fasciæ, together with the contents of the absorbents, lacteals and lymphatics, pouring out their serum, all which is rich in albumen, and all the sources which I have already shown are equally diligent in aiding and assisting one another. We may then naturally ask the question:—What part does the blood actually play in all this reconstruction? Physiologists have hitherto said; All and everything. Now I say, It is totally impossible. In fact, it plays but a very small part, and what it does, is only towards the *basis* of structure, and this it could not do without dilution from all the inorganic fluids present there, and all those which are continually being formed by the never-ceasing combination of oxygen from the air with the hydrogen in the system. Physiology is for ever cropping up throughout scientific inquiry, with all naturalists, whether they be botanists, entomologists, or anything else. The latter are for ever bringing forward some fresh wonder in the germinating of the ova of their little favourites; and the more they do so, the more I see that they prove the truth of my own views by showing, that blood has less to do with their entrance into life, than the inorganic elements first becoming vitalised, and after this, that true blood discs are formed. Since the discovery of a sponge being distinctly an animal and not a vegetable life; we may take that as a first step, for who has ever found the

heart and blood vessels or even blood in a sponge? As we ascend the scale, the blood, which we have been taught to consider a *primâ facie* element, will be found not to have such miraculous gifts at all; but to take its place simply according to its percentage of duty, when a certain perfection in being has been attained. Thus in the wear and tear and gradual exhaustion of all structure, solid, fluid, and gaseous, in the whole body, Nature obeys given laws of restoration and repair; and as this is constantly going on every moment of our existence in the highest condition of health, greater actions and duties are called into play. In any departure from this state, one may be from a state of disease, another from bodily injuries, wherever these may happen. The means taken by the *vis medicatrix Naturæ*, in the former condition, may or may not involve all her machinery, but only parts of it. For this reason; structure not having to be renewed or reproduced to any great extent, many actions throughout the whole system, whether arterial, venous, lymphatic, absorbent, or lacteal, may be perfect; so also may the nervous powers, both motor and sensient. This surely leaves but a limited amount of labour to be done. But, on the contrary, in some injuries there is not an action or material in all Nature's stores or powers of placing them at the proper time and in their proper places, that is not called into play, taxing every one of them. In fact, a fresh creation at a given point has to be accomplished; muscles with all their fasciæ and fasciculi, tissues and membranes of various kinds, every description of substance to be tunnelled through afresh with new vessels, and duly connected in their circuit. Nerves have to be carried along from old

sources and conducted to their stations, the ganglions; and, when all this has been done, the batteries to be duly charged and the lines made clear for telegraphic purposes. Old materials, which would poison or impair the process, are duly thrown out of the system; but in the endeavour to make new structures, much valuable matter, more than sufficient for the purpose, still remains about, fit for the employment of her new-made absorbents, &c., to be carried into the general laboratory. Given to a carpenter three twelve-foot boards to make a box; when he has done it, he stands up to his knees in shavings, sawdust, and chips—all new materials, but valueless to him. Not so the analogous substances in Nature—these, as I have said, are worked up again. What, then, are the powers called into action, even to make a simple cell as the nucleus of a part? Why, they are great and manifold! Seeing how many of them, with all their combinations, are absolutely necessary to enter into the new structure—oxygen from the air and hydrogen from ourselves to form the simplest of the inorganic fluids. These assist in all the diluting processes on the one hand and all their inspissating properties in unison with carbon on the other, wherever fatty matter has to be deposited. The arteries deposit their structural elements and immediately find them diluted. Chemical actions ensue according to the laws of their places of deposit, for every part has its specific matrix of conversion of given elements to what are required there. In every one of these processes, however small, electric actions take place, whereby caloric is produced on the one hand, and, wherever nerve matrix is found, forms the wire that has been destroyed; but which, obeying the law of deposition and

increase of structure, precisely the same as every other, gets extended along the line and seeks the nearest ganglion; thus establishing a communication with head-quarters, the positive and negative poles becoming duly united. Every day now the process becomes more and more complete, and, the more complete this becomes, the more do we find all parts assisting others in the universal action of restoration. Here, then, we have the gases, the fluids, and solids. The two first, first in the field for operations, the latter forming gradually a base of operations. Who, then, can say which is greatest, or which is least, in all these great acts, all which we can only sum up as the *vis medicatrix Naturæ*? Though we have advanced our minds to the production of a cell theory, we have not taken into consideration the thousand matters, materials, and actions which produce it. If we reflect, then, on the fluids of the body which exist irrespectively of the blood; if we reflect on the inorganic menstruum in which the organic portions of the blood are held for purposes of solution and conveyance; if we reflect on the fact that many parts and structures are formed irrespectively of the blood—we are compelled to admit that it is not to the blood that so many creations of matter are due. If we relieve the blood from the numberless duties we have attributed to it, especially that wonderful mass called fat, we shall find that it has still mighty and important agencies. There is not a part of the body that does not show this. If we only take the brain and see what the carotids send to it with their network of vessels on its membranes, and then see the great trunks of veins embedded in the skull bones, because the brain itself could not bear the

pressure of both sets of vessels; and if we could get away from received dogmas, and calculate, in an unprejudiced manner, that a greater quantity of blood is carried away from the brain by the veins than goes to it from the arteries—we then simply admit, that the arterial blood only supports structure. That the ventricles contain a serous fluid made by the gases, like any other inorganic menstruum, for lubricating purposes, entirely independent of the blood; and that this quantity must be constantly formed and used to a certain extent; but what is not consumed, is carried by a wise process into the veins and hence out of the cavity.

XV. As so much blood becomes residual and consequently acting as a menstruum, we have yet to ask if this menstruum is used for other purposes?

The answer is directly applicable to the uses of the liver and spleen. The liver receives the venous blood from the abdominal viscera; but I question, if it had not the reinforcement of that also from the spleen, that it could do what it does; it would be too poor in organic elements.

Great advances have been made of late years in the anatomy of the liver, and we are certainly better able to speculate upon its duties than formerly. Its tubular canals anastomosing everywhere, forming networks of cells in varied numbers, at given parts, having outlets into biliary canals. There can be no doubt of much oleaginous matter being secreted herein, which gives to the bile its peculiar saponaceous properties. Though the liver is not surrounded by fat, and fat is not required as a filter to supply it with lubricating inorganic elements similar to those which are required by the muscles of the heart; yet whatever the density of its

structure, the hydrogens from the body within and the oxygen from without must permeate it, and aqueous matter be formed therein as well as elsewhere. Yet, when this occurs, a quicker condensation takes place with the carbon, and instead of actual fat, oleaginous elements are formed, even in the condition of health. We know that in disease this occurs to a greater extent, as we have instances of what pathologists call a fatty liver. Many of these fatty livers are exhibited periodically as specimens of our present views; but often without taking into consideration the general fatty condition of the whole body, and that the liver only took its common share of the general bounty. The free and constant use of ardent spirits, will have the effect of absorbing this matter, consequently hardening portions of the organ, and we then see a hob-nail liver. Long habit of pernicious drugging, especially with the mercurial preparations, by first poisoning the secretions and albumenising them over much, enlarge and condense much of its structure. Nevertheless, I have only to consider the elements which go to the liver, from which another most useful one is made, and I have sufficient grounds for believing that it is to the integrity or otherwise of these as carriers of certain properties from which the liver is to make bile, that this secretion is either deficient or in excess; rather than what is generally believed to be some fault in the liver itself, in not secreting bile. It is too bad that this organ should be so grossly maligned as it has been; without a friend, and foes whose name can only be characterised as Legion. Depending on its supply of residual blood to make its peculiar secretion, it can only get what other organs send it. I believe it has a

good friend in the spleen ; for this reason, whatever may be the true use of that organ, it would not be there without a use. If what physiologists say of it, that it is a reservoir, but not a secreting organ ; that it makes nothing specific to be used again ; yet it still does great service, even if it receives large amounts of blood as a reservoir, and sends it forth again into the residual mass. Having no direct channel to the chylipoietic viscera, it is compelled to send its residual blood to the liver. We have a doubt thrown upon us, whether it has a true capillary system, or whether its returning vessels called veins are truly veins, or only a form of arterial structure with valves, and designated veins. However, call them what we will, it has always been evident to observers that the blood from the spleen seems to have been very little altered from the state it went in to the state it comes out. Nevertheless, changes do take place, and some structural condition of the spleen alters the blood, and so supplies elements for the manufacture of the bile ; without which the bile could not be what it is. I have ever considered that the bitter principle of the bile owes its origin to the blood from the spleen. This principle seems so necessary to the system, that even in our most healthy states, our most refreshing beverages are bitter ales, and the bitters used from time immemorial as a condiment and provocative of appetite. In fevers when thirst prevails to so great an extent, the spleen is known to be inactive or under some abnormal condition. In these states, the bitter medicines, quinine, bark, &c., and bitter drinks are always refreshing, and when the fever abates, and with it a healthier condition of the spleen takes place, thirst also abates. But this again is entirely indepen-

dent of the supply of the inorganic fluid lubricators, and, as I consider, merely accessory to them and their uses and influences. I will not and cannot go so far as to say that fevers are due to abnormal conditions of the spleen; yet it is a curious fact, which I have observed hundreds of times, that persons who never suffer thirst, and scarcely know what it is, are never subject to fevers; while those who suffer from thirst, are those who suffer from and are most liable to fevers. Putting all these things together; I think it is to the spleen, and the blood which passes therefrom, to help and to mix with all the other residual blood of the abdominal viscera, that we owe the bitter principle, as well as other valuable properties of the bile.

The bile must obtain its alkalinity, as well as its saponification and all other peculiarities, from the chemico-vital processes which take place in the liver; precisely in the same way, that deposition of structural deposits from the blood at certain parts produce, by their peculiar matrices on which they impinge, the varied structures we see; while its quantity, whatever that may be, varying at different times, must depend on the supply and character of the residual blood, both from the spleen and the abdominal viscera. It is a great delusion to call a liver sluggish which makes no bile, when probably there are no elements there for that purpose. On the other hand, excess of elements are often sent to the liver, and consequently excess of bile is made. The action and duties therefore of the liver are more regulated by the condition of the blood sent to it, than by any other cause. If we view the size of the organ and its simple structure and duties compared with every other, we cannot be justified in

laying to it the cause of the majority of small ailments ; aye and great ones too. Even, after all the biliary elements are abstracted from the residual blood of the abdominal viscera by the liver, there is still a residual mass left, which is sent on to assist as a menstruum to the chyle going into the thoracic duct. The arterial current going to supply the structural integrity of the liver itself, supplies no element of bile ; but the residual mass from this source does, as it joins the general stream. Here, again, there is a confirmation of my previous observations ; that the blood cannot do what physiologists have hitherto said it does, when we see at every step in physiology, how much everything bears and does actually depend on something else.

XVI. What are the true uses of the kidneys ?

This short question depends for its answer on the uses of the blood, and the inorganic elements made in the system independent of the blood. For instance, so occult is the homogeneity of the blood, that chemistry cannot detect all its principles, neither can it determine at all satisfactorily how one element acts upon another, or how all its many varieties are dependent on each other. Urea is evidently an element necessary to it ; and yet physiologists say that the kidneys abstract all this from the blood. Now, this is totally impossible. If urea is in the blood, it must be evident that it is so for some purpose not hitherto discovered. For instance, the ascending aorta distributes its blood to the brain and upper extremities. The descending aorta does the same to all organs above where the renal arteries are given off. Hence in all this blood there must be a large amount of urea, and this urea must be a necessary element both to the blood and the system.

itself. Now, there are only another pair of arteries given off from the descending aorta below the renals; and these go to the genital organs. Urea then seems to me to be a necessary constituent of the blood for all parts and organs of the body; but, inasmuch as there are no organs but the genital, below where the renals are given off, it appears evident that there would be an excess of urea in the blood going to the lower extremities, if the kidneys were not where they are to extract and eliminate it. Therefore, instead of saying that the kidneys purge, cleanse, and take away *all the urea of the blood*, which physiologists think would otherwise poison it, we ought rather to acquiesce in a natural rectitude, and say that it would not be there if Nature had no use for it; and our endeavour should be to discover her reasons for abstracting only a certain portion of it at the particular part she does. We have no right, in our ignorance of the matter, to attempt by our own imaginary reasons to convict Nature of an error for having urea in the blood at all, which, I consider, physiologists have hitherto done. We can only marvel at the great economy of Nature in removing a surplus organic element from the blood, as an excrement at this particular part. Even when she has done this, the menstruum from which it was taken is retained by her to mix with that from the other abdominal viscera in its onward progress to the liver, rich in every other property but urea. Considering the large quantity of arterial blood which goes to the kidneys, and the small quantity of uric and other salts which the kidneys extract from it, it has always struck physiologists that the veins of the kidneys were very large, and conveyed away an immense quantity of

venous blood. But when they saw this, and admitted the fact, they still came to the conclusion that all its aqueous parts as well, were likewise eliminated from the blood—that is, the whole ninety-five per cent. of aqueous matter which held the urea and other salts in solution. It never could have occurred to them, that it was totally impossible that this aqueous matter was extracted from the serum or *liquor sanguinis* of the blood, or, that the blood could possibly be robbed with such impunity of this. Nor that the aqueous parts of the urine contained no analogy to the serum of the blood, and that no chemical manipulation could get a watery extract from the blood, similar to that, which forms the menstruum of the urea, &c., as passed from the bladder, and known by the general title of urine. Instead, therefore, of searching for some other source for this diluent to the urea and its salts, the matter has stood without question or inquiry, and so the kidneys have been cheated of one of their most beautiful and greatest purposes and ends, for which a wise Providence has made them—namely, to filter excess of inorganic aqueous fluids by means of the fat in which they are embedded, from the system; making these at the same time instrumental as diluents in carrying off the urea and its salts. As I have elsewhere said, the fat which surrounds the kidneys is the natural filter to pour into the pelves of the kidneys its aqueous properties, so that they mix with the urea, and convey it away. Furthermore, that the kidneys are hereby shown to do a most beautiful duty, and assimilate themselves as assistant organs to the skin by regulating the quantity of inorganic fluids, and removing them from the system, as the case may be. In rich organic conditions of the blood we see the

urine equally rich in urea and its salts. In opposite conditions, the reverse. While there are states of the system when radiation to the surface is checked, large aqueous proportions of urine are voided containing very little urea or its salts. Here again I touch upon the point of difference, either chemico-vitally or by some important usage of mucous membranes; for it is most true that the bladder is only able in its perfectly healthy state to retain urine rich in urea and its salts, and is unable to do so to any such extent, when the urea and its salts are absent, or at least considerably deficient. This is when the pale citron-coloured urine is present, and must be voided very frequently, and which is often in large quantities, and contains little or no urea or its salts. There is abundant proof that this water or urine is not eliminated from the blood, but comes from the fat round the kidneys into their pelves, and is alone the true menstruum of the urea and its salts. Hence it is that fat is often seen in the urine, and great wonderment made of it, when it is not to be supposed that the apparatus filtering this fluid can always be in a perfect state of integrity, or that pellicles of fat will not escape. This has hitherto, from the dogmas of physiology regarding the kidneys and their duties, been considered to have been eliminated from the blood, when it is no such thing. The presence of albumen too has been treated in the same way; when everybody knows that albumen forms a large ingredient in the fluid of dropsies, and must also be always largely present in the inorganic fluids used for lubricating purposes, which are made from the gases.

Here, then, we see the sources of great errors of many things found in the urine; while the constant

testing by specific gravity or by nitric acid or heat, which has been considered to be proof of some blood alteration, resolves itself into a chimera. For these adventitious elements have as much to do with the inorganic menstruum which carries the urea, &c., out of the kidneys, as they have to do with any elements which escape from the want of integrity of the arterial machinery of the kidneys. No one can deny, neither do I, that this kidney machinery gets out of order, as in Bright's disease or in diabetes, and that other elements escape from the blood, besides the urea, &c. But this I am compelled to say, that many strange things attributed to the kidneys from the presence of elements in the urine, not usually found in a perfect condition of health, are as much due to the inorganic menstruum; and hence the many fabulous things said, written, and believed of these organs, which I have long considered as complete fallacies, deceiving everybody. I do not therefore consider the kidneys in the same light as physiologists have hitherto pointed out, as simply removers of all the urea of the blood; but only such a proportion of it which is not wanted. While, on the other hand, I consider the urea an important element of the blood for some wise purpose, or it would not be there. Neither from what I have said, do I consider their whole and sole use to be the removal of such small portion of urea, &c., seeing that the menstruum in which they are held and which enables them to be passed out by the bladder, does not come from the blood, but from the source I have pointed out. I consider the kidneys, therefore, as the 'scape movement to the inorganic fluid elements of the body, in the same sense as the colon is the 'scape move-

ment of the gases; though not in the same degree of importance to the general welfare and vital efficiency of the whole body; the former only acting excrementitiously, the latter furnishing powers and structures to the whole fabric, yet undreamt of in our physiology.

XVII. If we are to believe that our bodies consist of 95 per cent. of fluids, we are bound also to believe that their value is equivalent to their percentage, and to ask what they are, and what they do, and how they are formed?

Bones and nails can only be considered solids in the true sense of the term, and these contain a large fluid percentage. All the ashes of an incinerated body would alone be produced from these, and they might be carried in a moderate-sized snuff-box. Cartilage may be reduced to a jelly, and from this state to a fluid; muscles to a very small fibrous mass, and ultimately to nothing; and all other structure can be reduced to fluid. The fluids, themselves, uncombined with solids, form, as independent elements, a large percentage of the whole fluid mass, such as arterial and venous blood; the contents of the absorbent vessels of all denominations, besides the immense quantity of inorganic fluids lubricating every part of the body. Whatever theories have existed as to their varieties and quantities do not, I think, come at all up to their value or importance. It is very evident, on the most superficial view of the matter, that neither the moisture of the atmosphere, nor the fluids we drink, nor the aqueous matter in the food we eat, can supply or keep up this large percentage. If, however, we take the solids and fluids in their usually assigned weight or

quantity to each other, as forming the whole substance of the body, we are still under an error in not giving a practical weight and measure to the gases. The endless varieties of these and their combinations, will some day become a startling basis of calculation in physiology. No transmutation of substance, whether solid or fluid, can take place without gases being generated, and no solid or fluid can be formed without these again entering into them. The instrumentality of caloric and electric action causing or becoming the great causers and inducers of these substances, and into which they so largely enter. All these considerations seem to convince us of the fact, that nothing can remain any time in the system in the state it entered. It would appear that fluids may resolve themselves into gaseous elements by the laws of chemico-vital and electro-galvanic actions,—else our blood would be contaminated with every distinctive element we drank; whereas it is not so. On the other hand, all fluids made and used in the body are by the same laws the result of gaseous combinations. Without such laws, it would be impossible that the integrity of the whole machine could be kept up in all its parts, or that we could have such regular and systematic depositions everywhere, to make new life from the germ, or for the repair or reconstruction of parts from accidents or disease. Neither should we have the same results so persistently, when we see the great variety of animal life and the greater variety of the foreign ingesta this animal life receives. Taking the human family alone, and contrasting the Orientals and their farinaceous diet and water beverages, to the Esquimaux and their peculiar blubber diet; the various

species of savages, from the herbiferous, the fish eaters, and the cannibals, and other filthy feeders, to all the variety of the Europeans, from the highest classes to the lowest; yet, seeing human animal nature always obeying the same laws. The principal distinctive elements eliminated are their odours; and these depend upon the matrices of such odours as much as on those which distinguish plants, flowers, &c., from the pleasant to the most disgusting. This fact is also demonstrated in the various forms and alterations in the secretions of the body in the highest state of civilised individuals;—some being pre-eminently pure and sweet, not depending on soap and water and proper ablutions, but on other causes; while others are equally offensive, and in which no amount of purifying ablutions can alter or make otherwise. While everything of the same genus and type appears to be similar; yet nothing in Nature, where all the elementary substances contained in solids, fluids, and gases, enter to form parts of, or whole bodies, can be exactly alike;—no two leaves or flowers, no two trees, no two animals of any kind, not even their spots or markings. No bulb will yield the same distinctively marked flowers a second year;—as tulip growers and in fact all nursery-men know. No two things throughout Nature, which have to be formed by themselves, can be exactly alike. This is simply owing to the irregular manner in which the elements are compelled to come together, whatever form they may take in their first germination, whether from a seed, or ova, or impregnation. Directly a nucleus is formed, and the substance, whatever it may be, becomes *per se* distinctive, then that which is contained within it exercises on it particular actions

by given laws. This is seen particularly in grafting, such as a peach or a neetarine on a plum stock ; any given kind of rose on the stock of the common dog rose, or any other similar actions. Directly the sap reaches the graft, then the peculiar elements in that distinctive order perform their duties, as if it had received all its sap from a stem or root of its own species. There can be little doubt that a great law is shown in the predominance of the fluid elements, from their being such powerful and ready conductors of electricity, and the extreme readiness with which light and heat, dryness or moisture, or even the electric conditions of the atmosphere itself, are received by them, and prove on what substances and powers they have to act. On the natural laws of the combinations of the fluids when once formed, the phenomena of life, health, or disease, greatly depend. A vast number of these fluids come under the denomination of '*the secretions*,' rather as an arbitrary term than otherwise. It evidently facilitates medical expressions and meanings ; as we say, ' the secretions are out of order ; ' or, ' in a morbid condition ; ' or, ' correct the state of the secretions.' We cannot say, ' let us alter the arrangement of the elements of the secretions ; ' and if we say, ' let us put the secretions into a better state ; ' we then use two expressions which we cannot follow out, because we simply know nothing at all about the natural arrangement of them within the body. Hence it appears to me that as any departure from their healthy standard is in some altered arrangement of them, and as these are both organic as well as inorganic, as I have endeavoured to show, disease may be as much owing to a morbid condition of the one

as the other. From this consideration I have always opposed the doctrine of what are called 'blood diseases.' Blood poisons I have always ranked with the vast army of liver complaints, which, in medical parlance, are simply expressions which everybody uses and nobody knows anything about, and therefore cover an enormous amount of ignorance. Should this term, however, be thought too severe for my readers, true as it may be, I would substitute that of showing how much we have yet to learn and to find out.

Take the hosts of skin diseases, from the simple rash called the red-gum or white-gum of infaney, to the most pustular or squamous, in all their variety. Are these to be attributed to the blood alone? I say, No. Take, again, the sebaceous follicular deposit: this may be formed by the inspissation of water made from the union of the oxygen and hydrogen gases, assuming more carbon at the expense of the oxygen, precisely in the same way as the fat is formed; but lodging at a part where resolution of it may be temporarily prevented, and so fixing itself to be added to by the same laws which originally formed it. We all know how slowly this morbid speck grows. It may continue about the same size for months, or at the end of a year or two it is nothing to speak of; it does not interfere with the comfort of the individual. This surely cannot be called a blood disease; it is only an adventitious growth from the inorganic elements or secretions. But, being there, Nature somehow takes care of it as a parent, and begins to invest it with a circumvallation of organic membrane, and supplies this with blood-vessels, and then with absorbents, &c., and lastly, with nerve powers; precisely as she takes the

same care of fat, fascia, &c. Then it begins to grow apace. They are seen on the head and on the shoulders principally; but these fatty tumours occur everywhere. I never lost an opportunity of taking these out of the head, and have removed many. The tenaculum and scalpel are certainly the nicest instruments to use; because by first making an incision, the tenaculum can hold them up nicely, so that the scalpel can be passed round without breaking them. But I have frequently done it with a common lancet and forceps. If we examine one of these well when it is removed from the head, it is only a sebaceous or cheesy mass inside; but the beautiful network of vessels round and about it, and the vascular bed from which it has been extirpated, show how industrious Nature has been in perfecting this once simple inorganic deposit. A large fatty tumour from the shoulder, or any other part, has only a different sebaceous arrangement. So it is with the more important abdominal tumours, which grow quicker and larger from the very fact of their locality favouring this; like some plants, which grow small and stunted in the open air, but luxuriantly in the hot-house or conservatory. These tumours, then, of whatever kind, are first the depositions of inorganic elements, or secretions, till Nature dignifies and invests them with organic life, by supplying them with organic membranes. There is no doubt but that early life is far more indebted at first to the inorganic elements than to the organic; for the first steps to increased vital powers or super-vital actions, are due to the redundancy of the inorganic elements. It is by subduing these in the first steps of functional disturbance, that a balance of health is attained; not by

reduction of organic elements. The plus of power in all these inorganic elements consists in the richness of their acid bases. The first act of a *vis medicatrix Naturæ* is simply seen in the fact, of all foreign ingesta being of an alkaline character, in order to reduce the high degree of acid development in the organising processes constantly going on both within and without the body; and so they act both as a diet and a medicine, and produce a balance of health, by causing and continuing a balance of the chemico-vital conditions of the secretions, which are, in fact, the combined organic and inorganic elements of the body. If these beautiful processes do not succeed; the next act of Nature to get rid of a super-vital or acid action, is by an eruption like the red-gum, &c. But if, again, this is not sufficient, then a vomiting or a purging occurs, which removes the super-vital or grosser matters. Nature, therefore, is clearly seen to be too wise to take away, or remove, or even to reduce, organic elements; she has no idea of losing a vital power in this way, for it is clearly shown, that when organic elements are insufficient, and she wants them strengthened, her first act is to retain the inorganic to help them. Physiologists reason thus:—that there is an element in the blood which produces small-pox, that whatever the number of generations a vaccine virus has passed through, which one would suppose would have destroyed it in their successors, yet, notwithstanding this, all new beings have the germ within them, and it might come out as small-pox at any predisposing opportunity. Vaccination having been found destructive to this germ in the blood, can you deny that this is a blood disease? I do; because I believe that the

germ or element which produces small-pox, may be equally fixed and diffused in the inorganic as in the organic elements; and I ask the question; Why should it not be as much in these, as it is in the arterial blood itself? In short, I consider it far more likely from the simple fact of the inorganic elements being at least 90 per cent. more in quantity than the organic. Secondly, when small-pox is seen in its most virulent form, when not a pin's head can be put between any pustule all over the body, that the supply to all these pustules comes to them in the same ratio of 90 per cent. from the inorganic elements. Thirdly, that it is totally impossible they could be supplied from the organic elements or the blood alone. And fourthly, that if they were, as is believed to be the case, the very fact of any individual recovering from such a drain on this vital organic current, is ample proof that it cannot be so. There is quite tax enough on the organic elements to bear their 10 per cent. of the strain, to make and repair the structural matter destroyed at the bases of each pustule. Again, the very fact of the pustule respecting no part of the body, inside or out, proves the universality of the poison, as much as the fact, that the disease itself is Nature's effort to get rid of it, from both elements respectively. When, therefore, this diffused poison is thus thrown out; Nature has performed already her *modus medendi*. That which we consider disease, Nature calls a remedy; for the disengagement of the poisons which to her were disease, are thus thrown out of the system, to her inexpressible relief. No medicine is required here. All that the system wants, is plenty of the raw material or fresh ingesta, such as meat and beer, to support the

reconstructing powers. The inorganic elements she can make fast enough, if there is only sufficient oxygen from good ventilation. The electric action of light should be removed, and the fæces not forced out of the colon by aperients, but rather allowed to accumulate, to make the hydrogens plentifully, to meet with and combine with the oxygen; and when all these actions have been naturally and artificially cared for, no injury to the body ensues. I have taken the graver form of elementary poisons in the body to illustrate what I believe to be the case, even with the great army of skin diseases. Many of these require no internal medicines; in fact, I have many times observed that these, given with the best intention, have rather done injury than good. It is more to the proper uses of external applications that they yield, by killing them as they crop up, and not allowing the skin or subcutaneous structure to get into the nursing habit of protracting them; for here, again, the principle may be seen of Nature showing, even to abnormal developments, the same care as she does to normal ones.

All mucous membranes are covered by and moistened with the inorganic elements. If these membranes lose their activity of either exhaling or absorbing these natural lubricators, or in keeping them thereby in their active state, these inorganic elements actually become organised. Whooping-cough is a distinct example of this; for where this process has taken place, loose organic folds, partly attached and partly detached, cause the phenomena we see. All congestive actions show this principle in their first stage, and may be developed everywhere. Their most

favourite parts are the throat and glands; the trachea, the upper part of the bronchial tubes, and the extreme ramifications of these. Nature always endeavours to rid herself of this by additional secretions, to assist exfoliation, thus bringing about a healthier deposit. Hence the quantity of mucus which we see occasionally thrown off; a disposition to be encouraged by stimulating expectorants. Physiologists have considered these to be the last efforts of slight or chronic inflammatory actions. They are no such thing. They are in themselves the most primary actions that can ensue. As they take place in the ducts and tubes of glands and of other organs, they may be always considered as super-vital or acid actions, requiring correction by alkalies. Hence the value of these remedies in all such cases, to be combined with fresh ingesta, which is always alkaline. An axiom which I have long used most expressively, may be resolved into a philosophy, which is; Never starve a congested mucous membrane. All common colds and first disturbances from excess of the inorganic elements, should be thus considered and treated. Unfortunately, however, attacks are made on the organic elements, and these are sought to be reduced, when they should be let alone to help reconstruction. The opposite to all these things occurs, when Nature herself, acting too powerfully on super-vital elements which oppress her, removes them too quickly. This causes a deficiency of them in the system, and wherever this happens, the parts are left bare of their protecting coverings and common lubricators. When this takes place it is known as INFLAMMATION.

Inflammation can therefore only happen from the absence of inorganic elements, which are the natural

fluid streams of the body, and the great buffers to all oxydising actions. Instead of the super-vital actions which constitute the congestive states being present, we now find that inflammation has set in, which is the very opposite. We are driven, then, to this conclusion, —that inflammation is an infra-vital action which immediately lessens the powers of life. Usage, experience, observation, and many other facts, have shown us the pernicious practice of blood-letting in these cases. We only cease to do these things, because we have found them prejudicial rather than otherwise. But the true philosophy of the question simply rests in this;—that by depleting, we take away inorganic secretions, and so add to the evil; while we remove at the same time organic elements, which are wanted for reconstruction. If, then, we consider the inorganic elements in excess to be super-acid or super-vital conditions, and view for the first time the inflammatory actions as infra-vital, and therefore showing a deficiency of the acid elements; we should, I think, conclude, that these ought to be supplied artificially, for such time, at least, until the natural ones are again secreted.

There is, perhaps, no disease which shows this truth more than scarlet fever, and it is singular the unanimity of treatment by acids which this disease has obtained, together with all those elements of diet which in their last act produce the largest amount of acid; such as milk, mutton broth, boiled fresh meats, &c. So that a well-conceived empiricism at last bears out a philosophical truth, though this latter has never entered into the calculation. The next disease which shows it most, where art, more accidentally than philosophy, has pointed to a truth and a fact which it fails to explain,

is the use of lime-juice in scurvy. The elements of life being below par, the inorganic elements almost exhausted, and the organic elements not sufficiently renewed, produce such havoc in the system, that the latter becomes powerless for reconstruction. The friendly aid of lime-juice comes to their assistance. What have we done, then? We have simply assisted Nature in the formation of the inorganic elements by a temporary substitute in the absence of fresh diet and vegetables, from which she would have done it herself, and thus recovered the lost power in the system. The whole treatment of scurvy, resolving itself as it does into bringing about 'an improved condition of the secretions;' which means anything or nothing, just as men may imagine something taking place by some latent power of the *vis medicatrix Naturæ*, is nothing more nor less than the perfect restoration of the balance of power between the inorganic and organic fluid elements.

Nothing can better illustrate the wonderful action of these distinctive elements on each other, than the fact, which many men of observation have noticed, of certain abnormal conditions of the urine. Urine may be passed into a vessel and become very thick and turbid on cooling, with all the abnormal deposits betokening a disturbed condition of both the inorganic and organic secretions. Not as physiologists would say, from the blood alone, but from both the sources I have pointed out which form the urine. The same person or another may void his urine in the same vessel, and instantly dissolve all these morbid elements, and the two urines shall become clear, and it shall not be turbid again on cooling. Here is a fact which shows clearly one of

those hidden laws of the *vis medicatrix Naturæ* which is going on in a thousand ways daily and hourly in the body, and is one of the great fundamental principles of keeping it in a balance of health. Now it happened that this fact struck the mind of an intelligent American surgeon, who argued in precisely the same way, and found that some peculiar condition of urine caused stone in the bladder in a patient under his care. He put himself under a little diet and treatment (which he need not have done, as far as I could see) and injected his own urine, at stated times, into the bladder of his patient suffering from stone, and completely cured him; dissolving it by these means. The case was recorded some years ago in one of our medical journals, and it made a great impression upon me, as one of great truth, great observation, and great originality. But, instead of profiting by it, I remember that the journal which recorded it, animadverted on the disgusting procedure, &c., of injecting the excretion of one man, into the body of another. Could this natural cure be worse than transfusing the blood of one man into that of another? This may be called quite a different thing. I say, No. For in the case of the American, the urine of one man was simply infused into the organ of another, specially made and provided to receive a similar secretion from the man himself. This journal treated the matter as if the man had drank it, and therefore saw no wisdom or genius in the surgeon. If chemistry could have provided a solvent equal to the natural one; would it have been so disgusting to have injected that? How much more beautiful in using Nature's own solvent, which we cannot imitate or equal in any way! If, therefore, so

dire a disease as calculus, can be cured by so beautiful and natural a process as that adopted by the American, how much better than waiting till an operation is inevitable! How much this one fact shows how many diseases of the body are constantly under the same processes of cure by natural laws—by that *vis medicatrix Naturæ*, we are always prating about and know nothing of! But when any gifted mind endeavours to illustrate them by years of study and observation, he finds his generation too prejudiced to receive them. Blows, bruises, contusions, sprains, and many such like accidents to structure, show clearly that neither the vessels carrying the organic elements, nor these elements themselves, can be the only injured parts; though we do see the evidence of bruises from a temporary rupture of the blood-vessels. But the pain and aching of the parts, are as much produced in the fibres of the muscle being knocked altogether into a solid mass, and the inorganic fluids thereby unable to penetrate between them. This gives rise to a wonderful pressure on all the adjacent nerves, by the inorganic elements not finding their proper outlets. Every part about the injured region thus suffers, from having lost the equilibrium of vitality. From these facts I have little doubt that in the natural alteration of these muscles or fasciæ, from similar causes, that we have the same phenomena exhibited in rheumatism. We know that the blood globules in the synovial membranes of joints being too large to pass through the vessels; cause, first a pressure on the nerves, and then enlargement by sympathy of all the surrounding parts. We foment, or use a liniment. The natural effect of the first, is to distend the small vessels on the one hand,

and, on the other, to liquefy the globules by the additional heat; and we give relief. On the other; the use of friction with liniments produces electric actions, which engender heat or caloric for the same purposes. If these are not the physiological deductions to be drawn; what are they? Again, the riotons and uncombining gases, impinging on and traversing through tissues and parts, produce the same pains in them, as they are seen too often to produce in the abdominal canal. Fomentations, frictions, and such like remedies are of world-wide adoption, and relief often comes. Direct injuries from blows or other causes, may produce abscesses from the fact of their having destroyed structure beyond reparation except by reconstruction; whereas, abscesses are not produced by flatulence in the abdominal canal, nor between muscles; neither does excess of the inorganic elements from not being able to traverse accustomed channels, produce abscesses. The peculiar effects of blows, bruises, contusions, sprains, &c. with their attendant extravasations, show as much disturbance in the inorganic elements as they do in the organic; and in their injury, as in their recovery, they take their natural percentage of value; for unless physiology begins to consent to this reasoning, it will always fail, as it always has done, in having any philosophy or common sense attached to it. We must therefore give equal value to both the organic and inorganic elements, fluids, secretions, &c., under whatever name they are called; and this value must be admitted, according to the percentage of quantity of each.

XVIII. What are the nerves? What are their peculiar duties? Are they producers of powers, and,

if so, whence do they derive their own? Are they, strictly speaking, agents made by material substances, just as everything else, but capable of producing immaterial essences? In short, are they masters or servants, or both alternately?

These questions naturally lead to others. For instance; is there a power in the body independent of all matter, or of the nerves and their aura? Is, for instance, 'THE SPIRIT' of Hippocrates to be considered as such; or 'THE ANIMA' of Stahl; or 'THE ARCHEUS' of Van Helmont; or 'THE SENTIENT PRINCIPLE' of Whytt; or 'THE ORGANIC FORCE' of Müller; or 'THE VIS VITÆ' of many authors; or 'THE MATERIA VITÆ' of Hunter; or 'THE EXCITABILITY' of Brown; or 'THE SELF-REGULATING PRINCIPLE OR VIS MEDICATRIX NATURÆ' of Cullen; or 'THE VITAL PRINCIPLE' of the modern school? All these seem to be similar theories, centering round and meaning the same thing, and suggestive of a power independent of all matter, which influences and regulates it just as it pleases. But is it scientific or philosophical to acknowledge that which has no material existence; which cannot be analysed or in any way made evident to the senses? Those doctrines, which have solely originated in the imagination, cannot and must not be regarded as undisputed truths. I therefore deny the presence of any independent power in the body, or any vital power in the system, unconnected with the laws of matter. For this reason; that no power of whatever kind can exist anywhere, in any organic substance, except in alliance with matter. Matter must first produce it. But as all matter is so inextricably blended with what it makes itself, and is influenced again by its own

formations and productions, that it has hitherto been considered impossible to separate effect from cause or cause from effect. We might say, that that inscrutable aura which passes through the telegraph wires is an independent power; but we are immediately answered by the boy who works the machine, that it is produced by matter. Science has asserted that much of our bodily matter and forces are influenced by the nervous powers; so they may be, but the boy who works the telegraph would naturally say; Where does the matter come from which makes that? A power may be evolved in the germinating act of a plant, which shall produce such activity in the elements from which it was itself produced, as to lead us to say, that it is an independent power, and we give it various names; such as 'a vital action,' 'a chemico-vital action,' 'an electro or galvanic action,' 'a force,' 'an exciting,' or 'a regulating' power. We can readily admit this; but not any independent principle. A similar power exists in animals, but which goes one step further and produces instinct and a 'sentient principle;' while in man it takes another step, and in addition to instinct it gives thought or 'spirit,' or an 'archeus,' or 'anima.' There seems to me to be no difficulty in admitting, that with increased power owing to increased organisms, that there should be increased attributes; but then again, no independent principle. Simply to show how this power can be further augmented, our present horticulture and floral culture are made to yield the first principles in a higher degree by cultivation; secondly, in making animals submissive to our uses, by training and increasing their instincts; and thirdly, in ourselves, by education. It is the simple idiosyn-

crasy of these ethereal essences, augmenting higher characteristics from material agencies, which produce the tendency to more exalted issues and results, which act in various directions and give us men of every class of attainment; some cultivating one or two branches of art or science, some more, and others a host of them; while some are not able to cultivate any. Therefore, to admit for one moment that there is an independent power, free and clear of any producing cause, is as great a fallacy as to give the same properties to a stone or a rock, which have no power of producing anything of the kind. The first germ of this power is evidently shown in the vegetable world, as I have said in a previous section, in the arrangement of the juices of the plant, whatever they may be. First, in its growth and general formation; secondly, in its flowering; and thirdly in its fructification in order to be able to reproduce its species; and fourthly, in its odours; the deficiencies or excesses consisting in the presence or absence of certain matrices. Some forms of vegetation neither flowering nor giving odour; some flowering and not odoriferous; others combining both principles. Here we have more or less peculiar habits and laws of combination of their material gases, fluids, and solids; producing the different results we see, but coming from no independent principle. The peculiar law of vegetation is to make use of everything, so that there shall be no effete or faculent matter. Everything is converted and made use of at the time, obeying laws of periodicity, of greater or less growth, to attain perfection. Arriving at this, at particular times, it stops and becomes exhausted; but returns again in due seasons to the same active state, and so it may go on for years,

while others are what are called annuals, biennials, triennials, &c. It is thus that in vegetation all is growth, with now and then suspension; but no storing of effete matter, and only that conservation in all things which amounts to the simple act of temporary suspension from a certain activity.

From the lowest animal, developing an instinct peculiar to its kind, we can only look on this as an exaltation of the same governing principle of the union and combination of matter which regulates the production of a flower or the odour of vegetable matter. But here we see powers of husbanding or storing of elements at given parts, without which we should not get the instincts. Thus we see for the first time something taken, something stored, and something cast off as excess, in the form of effete matter. The lowest organism of animal life showing only one cavity for the purpose of receiving food, so that when anything is received into it, it retains it, abstracts something from it, a low form of defæcation ensues, and then this is cast out from the same organ,—a mass totally different from what was first taken in. Again, we see those animal existences which have two organs for this purpose, others with three, and so on; so that, what is taken goes through certain canals, and effete matter is consequently stored up; having its duration of usefulness, and then passing out at another or opposite end or part. If these acts have been looked upon by physiologists only as simple facts, and no distinctive attributes given to the uses of the effete matter; then I say, one of the most beautiful laws for the germinating of vital gases, as resisting powers to the pressure of the atmosphere, and in their train a thousand principles

of life, have been wholly and entirely ignored, and a great link in the long chain of vital power and existence, utterly unaccounted for. Ascending the scale where reason is added to instinct, we find far higher organisation, with increase in the number of elements, more rapid combinations, indeed so rapid, that I cannot but suppose that elements are produced which we cannot grapple with nor define, and of such evanescent character which must for ever elude science. We have, in fact, no means in our laboratories, and no instruments of so perfect a character, as to be able to detect the subtle changes in their countless and wonderful metamorphoses, and which can only be poetically rendered by a

‘Snow-flake on the river,
A moment there, then lost for ever.’

And perhaps it is, that ignorance here is more beneficial than greater knowledge. In this state of higher organisation, we see higher and more complicated organs for the reception of effete matter, to serve ends which I have already spoken of, and higher still, of which I will hereafter speak. As I hold that we cannot have an independent principle in the body; I am led to conclude, that whatever has been associated with this idea, is something which must have emanated from matter, and been part and parcel of it, though intangible and unseen; precisely as we use the machinery of the telegraph, to convey thought thousands of miles through a wire. We can no more trace the words conveyed through these wires or the aura which produced their value at the furthest end, by cutting off a piece and analysing it; than we can find pent up thoughts or the nucleus or the débris of them, in dissecting a brain after death.

In the physiology of this subject, and in endeavouring to detach the idea of a foreign and independent element from the body, we merge into the psychology of the mind,—one of the most difficult of all occult problems, yet I think capable of more practical elucidation. I have endeavoured to show, how the combining of elements within all living matter causes not only in each species something different, whether in vegetation of every kind; animal life below man of every kind; and the most varied of all animal life; man of every kind. How often do we see what is called a '*lusus naturæ*' in the vegetable kingdom, a peculiarly altered flower from all others on the same plant? How often also do the instincts of the same class of animals alter? Horses or dogs which we have had for years will, on some occasions, from some freak or other not to be divined, do what they never did before. How much oftener also does this happen, than any power of observing or noticing them? Now if we entertained the idea for one moment of an independent principle in the body, call it '*archeus*,' '*anima*,' '*vis vitæ*,' or anything else, we should have just reason for saying, that as this is independent of all laws of matter, it would always be the same, do the same, and be always alike correct and consistent. In fact, I don't see how it could be otherwise; for as it would be consonant to say, that as it was there only to influence matter which had nothing whatever to do with its formation, no material substance could alter or influence it. But in psychological inferences, we have reason to think, that many believe this independent power to be at fault. Thus, after many years, we will say, of good behaviour, it alters its character, and affects the individual in

various ways, different to what it did once. Now, how can it alter, for it is an aura from first to last, has never been anything else, and can be nothing else? This proves, I think, that there is no such thing. If physiology cannot explain certain matters, and if chemists cannot account for the behaviour of their compounds, and end as they have ever done by saying, that it is no doubt due to some vital agency; evidently meaning this very independent principle in all bodies, which has beset all ages,—then I say it is better once and for all future time to give it up. I don't believe in it, nor can I think anyone else can who reasons upon it. We must, therefore, search after that which is more directly profitable, and within the compass of our reason, rather than call upon our imagination to explain the occult by an equally occult piece of metaphysics; for it cannot be called philosophy.

All enquiry into brain substance seems to end in the belief, that it is nothing more nor less than nerve matter, and as it is different to anything else in the body, I think the conclusion is fair. Anatomy, physiology, and pathology, are in unison on some of the most important points respecting it. The nerves having been very beautifully delineated, and their distinguishing characters pointed out; some as emanants, and others recurrents; some sentient, and others motor; all having origins and tracings through bodily structure, with their several duties of conveying or transmitting intelligence, or holding the powers in obedience, or prompting them to action. They transmit positive and return negative currents. They are made from material substances, as all other matter is made. Their usefulness no one doubts; they exist in all animal structure according to its requirements, from a simple filament

to the highest and most elaborate and extensive development. Touch the lowest animal organism with its simple single filament, and it gives notice of the susceptibility of its presence, and, as these increase, so susceptibility increases. As this increases again with increased nervous matter, so instinct of self-preservation, in a thousand ways, from avoiding danger, to reproduction and care of its species, follows. And here, in all animals below man, feeling is not so appreciated; because nervous structure is only associated with animal life. Reflection, thought, or reason, does not exist in them. Therefore, the striking or wounding of all this class, is a very different thing to that of doing the same with man. In the lowest orders of man—that class which may be termed brute-man, where reason is at its very lowest—any form of bodily punishment, or even torture, is not so much appreciated as it would be by the highly intelligent and civilised. Even in minds which have received education, with their bodies carefully and even tenderly brought up; debasing passions getting predominance therein, will render them insensible to the full degree of bodily punishment, as it does their minds to any sense of shame or remorse; the one seeming to act in unison with the other. This, I think, has been admitted by philosophers; but not by those who know nothing of physiology, or we should not see so much morbid philanthropy as we do; to the actual disparagement of the treatment of crime or advance in society. Because there is this marked distinction in the protection of the brutes from feeling bodily punishment,—there is yet no excuse for much of the unnecessary cruelty exercised upon them.

We cannot have viewed the powers which make up

the human body without seeing how much the inorganic elements have to do with all its parts, both in formation, repair, re-formation, and re-construction. The very large percentage of fluid elements in the system shows at once the capability of the nervous powers to perform their wonderful duties; for without these, they never could exist to the extent and usefulness they do. The copper wires of an electric telegraph surrounded by their protecting bands preserve them. How much more the delicate neurilemma surrounding the nerve by its beautiful coverings? At every convenient place a bunch of the matter called a ganglion, would show that any aura passing from even the most delicate and minute nerve of the most distant part, gains a force, or has the force of the aura kept up and enhanced; so that the slightest message is appreciated in the great substance of the brain itself, and immediately responded to; one of the great laws of this nerve power being, to answer every positive impression with a negative response. Not only is this done, but the great brain nerve holds counsel. A small thorn has conveyed its tiny but important message through the whole fabric to the central nerve of appreciation. The great powers are set in action by thought, which devises means to remove it. In some brains it is most imperfectly, most bunglingly done; other brains, more beautiful and compact in device, do it both cleverly and painlessly. This is just the difference between a bungling surgeon and a clever one; and all this difference lies in the paucity or the power of thought or manipulation of each: thus bringing both motor and sentient nerves into the strictest harmony.

As nervous matter is part and parcel of the material

substance of the body, and is made, through the assistance of that matrix which is peculiar to itself, analogous to that which, being deposited in other parts produces other substances; so is it by the same laws, peculiar to itself, sustained and constantly renewed and repaired if injured. That it is, therefore, a governing power, there can be little doubt; but this is confined to the two duties assigned to it, motor and sentient. I cannot think for a moment that it assists or influences in any degree the formation, progress of growth, or vitality of the system. First, because it must itself be formed originally out of matter;—secondly, that growth and all increase or expansion of tissue can go on without it;—thirdly, that this matter and this growth keep up the integrity of the nerve matter, and not the nerve matter, it. Therefore, if we consider nerve matter independent of the duties it has to perform; it can only rank as any of the blood-vessels, or any other structure of the body. We cannot say that the arteries and veins are the cause of the blood-flow; because they are only tubes to convey it. How, then, can we say that the nerves are the cause of vitality or anything else, when they are first made, and then upheld by those powers, which in their elaborate workings and combinations, produce the vital powers? Without nerves, we should be like the plants; these have many of the laws of life peculiar to ourselves, and have no nerves. As organism becomes more developed and powers are increased; nerve matter comes as a matter of course, and as these are further augmented by larger additions; so a higher nerve power exists. The nerves are therefore nothing more nor less than any other matter in other and different combinations.

When we come to the duties of this nerve matter, we enter upon another enquiry. They apprise us of a sentient action in the system. Distributed everywhere and for protection and convenience, the larger trunks always accompany all the large vessels; they have nevertheless an extensive ramification of small filaments. No combination or alteration of matter can go on in the system, without the necessary combustion of old material, producing in this very act an electric action; which is the great basis of caloric or heat. As this takes place everywhere; not the smallest space where these actions occur can be exempt. In health, when not a pain or ache occurs in the body, the duty of the nerve is to transmit constantly these results to the central nerve system, where they are duly appreciated by the buoyancy of the mind, and general integrity of all motor parts. But let anything occur to alter this, however small, it is the duty of nerve matter to convey it equally to head-quarters. If there is excess of vital action going on anywhere, which so enlarges or presses on nerve matter, it gives pain, because the nerves are so susceptible, that unless they have free action they soon complain. Hence it is, that congestive actions; such as distension of muscular fibres, excess of the inorganic diluents, or, on the other hand, the excess of these diluents unable to penetrate between the fibres of muscles; collect in any given space before they can find natural outlets, and so press upon nerve matter; or, again, the free gases in and between the tissues of the body seeking, and not finding, combinations, press or distend any delicate tissue. Nerve matter feels these things immediately, and conveys its grief to the sensorium. It can do no other. Hence

it is, that we have many little stitches and aches and pains about parts of the body, which come under the denomination of rheumatism, &c., and which are fruitful sources of this *bête noir* of our bodies. But, to show it more particularly; let the gases distend the alimentary canal, and what greater pain can we have than the tube so distended, that all contiguous nerves are either stretched or pressed upon, and we have what are called gripes, belly-ache, and a host of abdominal discomfords? I believe all the world will acknowledge that when infants and children have these little torments, both mothers and nurses are heard to declare that 'they have got the wind.' In after years, adults betake themselves to their doctors, who declare it *flatul*. So that there are many classes of pain from small causes, and these which I have mentioned are so common and so numerous and often so easily cured, that I thus place them in the first category to show how simple distension or enlargement from any trifling cause pressing on nerves, produces pain. What else has the nerve to do but to convey this to head-quarters? If it did not, it would show a diseased condition, but, in doing so, only a duty, being placed there for the purpose.

Animal matter does not require the assistance of nerve power to form it; it has its own laws, quite independent of nerves, the same as plants. Hitherto nerve power has been considered as a primary element, and hence has arisen all the fabulous dogmas of the 'ærelicus,' and the 'anima,' and the 'vis vitæ,' as a separate or independent force for the assistance, formation, conversion, healing, or any other term used to imply an active agency in life; but which require nothing superadded to what the laws of matter possess

of themselves. Nerve matter or nerve power cannot have this more in proportion, or less analogously, than any other substance; as far as the chemico-vital actions of the whole body are concerned. Still no one can deny that nerves have emanating principles of their own, precisely as all other matter. But this latter always comes under the denomination of some form or substance, something that is tangible, that can be seen, handled, investigated, or even analysed; while that of nerves is shown in immaterial essences, such as thought, or will, which cannot be so handled nor analysed. No one can tell what another's thoughts are, and, when uttered, how they were engendered. We may dive into the laws of matter, and find out its component parts, and judge, but even then only to a limited extent, how they are formed, by the combination of the gases, fluids, and solids on one another. But we cannot tell how the nerve matter of the brain excogitates or forms its thoughts; or why such a difference should be shown in their development. We see genius in a thousand shapes developed at the earliest ages in some form, and marvel at one so young having a gift for music, another for figures, another for something else; masters at once of arts or sciences which often the most gifted can never attain by the hardest study, or most laborious endeavours. Again, we see the opposite to all this in the born idiot. Again, the young prodigy of talent may have a feeble weakly body, and the idiot, a very vigorous one. Can, then, these immaterial essences of the mind have anything to do with the formation of the material structures? It is far more reasonable to say, that some of these, in their wonderful chemico-vital actions, had produced so

refined and exquisitely delicate a nerve matter, which again produced the phenomenon we see on the one hand, and that deficiencies of these wonderful arrangements had resulted in the other.

Reverting to the fact of all animal life being self-supporting; we cannot but admit that in being so, a vast amount of nerve matter is always under the same decomposition and alteration as all other, and that its elements are being carried all over the body; so that reproduction can take place whenever they fall upon their proper matrices. As long as this is carried on with due integrity, so the health of the brain nerve is kept up. But we know that that distinguishing power in certain people at certain periods of their lives gradually alters; and alters their character at the same time. It converts the spendthrift into the miser, the drunkard into the religious enthusiast,—indeed, from any point to its opposite. But it does this also partially. It gives rise to the host of disorders under the head of monomania. Sane on many subjects, lost only on one; it enters into a thousand channels of discord; and psychologists say, ‘there is softening of the brain;’—perhaps there may be hardening and condensing also. There may be also lessening of bulk without either one or the other; simply from uncombining properties of those laws of matter, which make nerve elements quite and entirely independent of the nerve force itself. Physiologists have appeared to me always confused in their doctrines, especially when their dogmas are applied to psychology. They treat the mind at one time as an independent power; but when it becomes affected, lay the blame to some alteration of structure which produces it. Thus they refute themselves by

admitting the very facts I wish to make clear. Nerves are not producers of force or power, but conveyers of that which is produced from other sources. Bones sustain power; muscles show it, use it, and even make it, precisely as nerves give intelligence or direction to them. Nerves are, then, only agents to convey the processes of integrity or want of integrity of all parts of the body, to some given spot. They act only as masters in directing and controlling, precisely as a government might direct a nation, or a general an army; as servants of the State. So nerves are now masters now servants to the body. Some of their most important duties lie in their motor sympathies,—a sympathy shown in one part for affections whose cause lies in another, and wherever these are distinctively manifested, the positive and negative, or current and recurrent, or reflex actions are seen. The great value and healthy condition of all nerves is derived, as I have said, from the inorganic fluids always keeping them moist. When a drought sets up in the system, such as in fever, &c., and these natural lubricators are absorbed; nerve power loses force. The motor actions are imperfect, and the sentient are in abeyance. People may roll about in their beds, but the muscles are under no control; they may talk a lot of incoherent nonsense, without power of arrangement, or knowing what they say. Severe blows may deaden nervous powers, and hence quiet them when in an exaggerated state from frenzy, delirium, or insanity. Hence, no doubt, the old barbarous system arose of the treatment of this latter condition by corporeal punishment. Extreme cold is said to deaden nervous action: so it may; but it cannot do so without first stopping

the combining elements, and arresting all oxydation and wear of present structure, and those elements which would repair this natural waste. It is in consequence of the electric actions which are produced by these being first partially arrested; that the nerve, having lost its natural stimulating agencies, has its functions arrested. The nerve structure itself, being deeper and more protected, has to wait for these other processes. Having temporarily lost its proper stimulant, no aura is generated for transmission; but, on its batteries being again completed and active, it returns to its former integrity. But physiology jumps to the conclusion, that nerve matter alone is thus arrested in its power; not taking into consideration all the other natural processes which must take place in gradation. In fact, they overlook the forces which produce the nerve current; and when they try to show that the nerve is thus deadened, because it is not any longer susceptible to touch of any kind; they say the nerve itself is acted upon; while all the time it is the power which produces the particular aura in question, which is arrested in all its actions. Thus artificial paralysis may be caused by extreme cold, or by a blow, or by a general depreciation of power from natural causes, or a depreciation of all those elements which make nerve force. Frost-bitten limbs or parts have thus had all the primary laws of their life first destroyed, when they slough away and fall off; but if they can be so treated as to become restored in their primary vital circuit before this happens; they may resume all their former powers and influences on the nerves. Sentient power may also be arrested by cold or anæsthetic agency as we know; while motor power remains the

same. Motor power may also be destroyed, and sentient power remain intact. As long as there is elementary fluidity in nerves, the electric aura made from the surrounding parts, is capable of being transmitted. The varied stages of appearance in all these parts when disturbed, can be best described by the action of the various currents of vessels. And here the nomenclature which I have endeavoured to introduce, as distinguishing them, would be of great use to the physiologist, for a varied appearance is always seen in congealed parts—very red, very white, or tumid. Now the word ‘congestion’ does not convey what we want determined more closely. If very tender and very red, the capillary circulation is at fault, and carries red globules:—to this I have given the term ‘INFILTRATION.’ Where the arterial circulation is in excess, and these vessels much distended; I have called it ‘EXGORGEMENT.’ When the venous circulation, together with the inorganic elements, are predominant in quantity at any particular part, it is then, and then only, I employ the term ‘CONGESTION.’ But this latter has hitherto served the purpose for all three actions or phenomena, and, though expressive and everyone seems to know its meaning; it does not convey the amount of specific disturbance; nor does it distinguish in what particular structures this evident disturbance lies.

In all cases of congelation, the wisest treatment has always been, to bring the parts back again by the slow process of reanimation; not by the application of direct heat, such as hot baths, fomentation &c. In climates where these actions are frequent; rubbing the part with snow and other remedies are the best which accomplish the end in view. The recovery is not by

or through nervous structure; but by all the parts resuming their own co-operative laws of restoration and galvanic action, which also includes the nerve matter itself. As soon as this is complete; the nerves again resume their power of transmitting the aura consequent on this state being perfected; and on again receiving their communications from those laws of matter, from which they can in such cases and places alone do.

In the opposite state to congelation, that of sunstroke; the remedies of ice and cold application seem to me to be opposed to all physiology. Here the nervous sensorium has been directly attacked by over heat, which has liquefied the blood and all the inorganic fluids to the highest extent, and forced them out of the cavities of the brain. The consequence of this is plainly shown, in the powerless state of the nerve matter itself. The treatment then should be; first to place the patient in a recumbent position in a dark room, and to apply *hot fomentations* to the head and down the spine, as well as to the extremities. It has been proved that the brain in sunstroke is emptied of its blood. Surely ice and cold does not tend to bring it back again! Whatever power the system may exert to do this, by natural laws of restoring an equilibrium and forcing blood into its accustomed channels, are abrogated; as well as those laws of the combination of the inorganic elements to give lubricating powers. The very application of ice and cold, upsets all nature's proceedings in a healthy direction. I do therefore say, that if brains are deprived of all their nourishing blood by a sunstroke, depend on it, warmth is the truest plan to restore them to integrity. But in the present

treatment by ice, it is better that death followed than life saved, to be for ever after subject to the disordered state we so often see after these severe visitations. For it is totally impossible that after the great disturbance of the material combinations of nerve elements, which we witness after sunstroke; and the present practice of preventing this nerve substance being restored by the use of ice; that the immaterial essences or thoughts hereafter to be fabricated by what is left with all its reasonable deficiencies, can be of the same healthy character as formerly. I am confident that if the plan I have sketched were adopted, many more lives would be saved, as well as minds, along with them.

Certain nerves are therefore only mere servants of the body, to convey intelligence of what is going on, and have nothing to do, *per se*, to aid or assist in the chemico-vital laws of matter of which they are only part. On the other hand; they become masters and directors of all such matter in its proceedings and uses. The affairs of life in every one must have direction, and each thinks what is best to be done in his own ease. Here, then, the essence of nerve matter is led to direct and devise whatever that may be. This, however, is influenced from another impression made upon nerve matter by the external senses. A blind man may be run over, while a man who can see may get out of the way: thus the eye has conveyed to the brain or nerve matter a fact which it instantly makes use of. A man without the sense of smell may stay where he, who has it in a highly sensitive state, would emerge as soon as possible. Another that is deaf cannot feel the distress of jingling or discordant sounds; and a fourth, who has no taste, will eat that which would

disgust the sensitiveness of the one who has. All these, then, in all their variety of the beautiful to sight, smell, taste, or hearing, or the reverse; show that they first influence brain matter by external impression, and often regulate the whole life of people in many wonderful ways; so I need not enter into them. Again, where all these have great influence on the mind through its nerve matter, they cause development of marvellous thoughts. They make the engineer, the mechanician, the poet, the painter, the musician, the theologian, the lawyer, the doctor, or the man of business. Some are thus born to command; others can never do so, and therefore must obey. Every mind has its own peculiar bias and direction according to its matrix, and that combination of material elements which are the prime movers in all these matters. I see no more in this, the highest organism that can be revealed, than I see in a similar germ of a plant producing its peculiar flower, and, in the step further, of that flower producing an odour. Or again, in the first formation of animal life with its single nerve, simply producing a quasi-sensitive action, and ascending in the scale with that which has its first pair of branches; others their second, and so on to the highest state of nerve organism in animals below man. In each as they rise in the scale we can only recognise just what we see; namely, some higher form of instinct. Reflection there is none, and feeling is only a most limited endowment. In all these states, physiology recognises only the simple elevation of a few elements for a few simple purposes, which answer all the ends designed by Nature. On the other hand, as they increase, so it recognises higher attributes, and when

these reach their highest standard, as in man, he immediately and thoughtlessly ascribes to them different laws; while they are only the same, more wonderfully developed, because of more wonderfully increased material matter. At one time, willing to treat the immaterial essences from this source, as something independent in the body to all matter; at another, in his character of a physician attributing altered changes of these, to disturbed and altered matter, and treating them accordingly. Let me recapitulate in a few words. Whatever we see in Nature, and wherever we can trace gradation of laws by gradation of organisms, we find increasing powers developing themselves for particular ends. In vegetation we see certain laws governing every individual according to its species; every plant or shrub showing distinctive characteristics; while vast families of them are improved from their natural wild state by culture, which always means more or less an improvement by manuring, coupled with the fact of giving to them the best atmospheric influences found most suitable or suiting their adaptability to the climate they are compelled to live in. If they improve, it shows the powers they have within themselves and their capabilities of higher development; so that we increase their size and the beauty of their flowers, as well as the aroma in the scent-giving ones; or, if in fruit, their bulk and flavour. The combining principle of elements in each, being different and distinctive, they use or simply appropriate everything from the soil or atmosphere; having their own means of conversion of elements in their own interior construction; but they are no storers of powers; having no organs for that purpose.

Animal life increases and improves on vegetable life, inasmuch as it has digestive and appropriative organs. But these would not serve its existence at all, if they were not accompanied by an organ for faecal deposit; so that, while vegetable life is compelled to be manured as one of its conditions for improved usefulness; animal life has an organ for carrying its own manure about with it. In addition to this, it has the accompaniment of nerve matter with its corresponding instinct. These two qualifications of animal life go hand in hand; for as nerve power or nerve matter increases, so faecal accommodation increases also. Nerve matter shows as beautiful a gradation as it is possible to conceive. In the lowest state, a single filament serves all the purposes; the accompaniment to this is one single organ for admission, digestion, appropriation, and defæcation of food. Thus a low class of instinct, with a low faecal action exists. Then we have a filament with a bulb or ganglion; to this in another order a pair of branches are given off; then again several; then many arising from these, and so on. With increase of nerves and branches, and ganglia, we have increase of the faecal arrangement, or that which is just as good and great; namely, the principles within which more vital elements abound; showing that the gaseous elements from this source, are necessary to the sustentation and development of both nerve matter and instinct. The same law is manifested, that the faeces of the animal corresponds to the manure in vegetation; and this occurs in both when we seek a higher improvement in that which we cultivate or breed. As we ascend higher in the scale of animal life; we find the colon and the nerve matter and instinct all increasing in proportion with

animals capable of greater usefulness to man. But should the colon not be seen to increase in anatomical proportion; the fæces contained within it will evolve gases of greater vitalising power. For, according to the gases gained from this source, does the health and capabilities and condition of the animal depend. If our agriculturists, horticulturists, and florists obtain such great results by the process of manuring and cultivating; so they will find similar laws to exist with animals. But with this exception; that the agriculturists or breeders of stock have overlooked one great point in physiology, and have only regarded the edible principle in preparing their animals for man's use; or simply, how they should be fed. While, on the other hand, they have totally overlooked, because they never knew; that from the animals' own manure, made from this food, he gets those gases generated which are used to form the greater part of his bulk. From these, in union with the oxygen, he breathes and absorbs into his system, he obtains all the necessary inorganic lubricating fluids and fat. Therefore it follows as a fact, as clear as truth can make it, that the richer diet makes richer manure. If this is true with those animals bred and nurtured for the edible uses of man; it is equally true with those others, which man breeds and nurtures to be subservient to him and for his uses. It may be clearly seen that everything depends on the storing powers of the colon; and the quality or quantity of manure the animal bears about within himself, keeping up day by day his vital energies. Thus the wear, tear, and decomposition of his own structures, whether solids, fluids, or gases, are always under transformation; making and mixing with new ingesta and developing every phenomena

incidental to each individual or class; but the largest proportion of which is done within himself and by himself, and more especially by his gases. When we approach the study of man and all his higher attributes; we must do so by the same laws as in the case of the lower animals, and so consider his higher organism in every way. We need not cast about for any independent principle, to account for what we can fully believe to exist in every square eighth of an inch of his body. As there is not a single space or part that all the laws of life, whether chemical, chemico-vital, electric, or electro-vital, calorific, or calorifico-vital do not exist, or that all these actions are carried on. Everyone of these taking place continually, according to the laws of matter, and not for one moment still; and all regulated by a certain balance of every element in proportion to the requirements; from the taking up of substances; from the natural decomposition and decay of old, to the forming of fresh vital elements with the new. That all things which come under the name of vital influences, which simply direct everything, are themselves produced within the body in a thousand ways by the laws of matter itself. Reducing all these actions to the limit of simply understanding them on broad and general principles; we find an equal value in the solids, fluids, and gases. If in our laboratories we have come to consider our acid agents by far the greatest and most valuable for all our primary purposes, and taking their opposites as re-agents to determine our results; so let us take Nature in all her laboratorial actions, as having a predominance of these same acid elements as a simple balance of power. We can then view her wonderful ways with more certainty

in the treatment of disease ; by thus seeing, that when she departs from this simple balance, it is by a tendency to increase rather than a decrease of vital power ; and so from a simple predominance of her acting acid elements she increases them ; and as she does this step by step, we find certain diseases of well-known or given classes ; such as all the congestive or super-vital ones. While, on the other hand, if these are driven off and become less than the simple predominance of them, which have produced what we know to be health, then an infra-vital state is exemplified, and all the class of fevers and inflammations predominate. The great problem of remedial agency ; the only one in fact with which all the previous studies of physiology and the chemico-vital laws of health are concerned ; centre themselves in the aid man can give to his fellow-creatures or to animals ; in curing by the most simple laws, that which is wrong ; let the malady be what it may. But this must be done in future with greater precision, and it can only be done by a better and more perfect understanding of Nature's own laws. Not the following any longer the thousand absurd dogmas of schools, or what is vulgarly called 'authority' ; considering which, *per se*, I have no great respect for, because it is founded on so much speculation and supposition, and what is not true. The safety valve for all ignorance being a supposed Will-o'-th'-wisp, or Vital Principle, independent of matter. We have to consider man in connection with all the foregoing rules of having animal and vital life in the highest degree. Not only his capacity of consumption and his powers of storing manure in his colon ; but that this manure, following the laws of his higher organism, is more

highly organised itself, and richer in all those gases which make up the sum of his existence.

Viewing all these matters from first to last; the only conclusion physiology can come to; debasing as it may appear, yet nevertheless true, is; that he owes all his high thoughts and aspirations, and all the wonderful efforts of his great and exalted mind—to his FÆCES.

PRACTICAL MEDICINE

IN ITS RELATION TO

PHYSIOLOGY.



I. WHAT IS DISEASE?

We cannot answer this question without first believing that Nature is always endeavouring to uphold an equilibrium of all her stores, which are many, and, moreover, of very adverse character and action; in order to produce a constantly healthy standard in every part. Now as this occurs in every individual according to his idiosyncrasy; we must at least concede to her, her own way of doing all these things. For this simple reason, that the varied matter constituting any living animal fabric does not, and cannot combine in exactly the same proportions in every individual;—a fact exemplified by no two persons being alike, either in face, make, general appearance, or power of body, or, in sense or capacity of mind. As long as these actions go on with the greatest integrity and regularity according to each person's idiosyncrasy; we have what is called health in that individual. So that, we cannot ever estimate the governing principles of life, health, or disease in one individual, by that of another; as every

one has his own peculiar standard. Take an individual, for instance, and suppose EXCESSES of vital forces, above their naturally healthy standard, accumulated in his body, whether they are fluids, gases, other secretions, or excrementitious substances; but which oppress, grieve, give pain or other discomforts. We then ask what is the *modus medendi* which Nature herself follows to relieve these several conditions. My own ideas are, that she will endeavour either to appropriate them or cast them off in some way or other. By this effort, she relieves the general system of plus what it requires; *ergo*, this effort is evidently her own means of cure; in fact, her 'VIS MEDICATRIX NATURÆ.' On the other hand, man, seeing this disturbance, says, 'This is disease;' and forthwith sets to work to cure Nature's *modus medendi*. Again; suppose Nature does not progress in her endeavours to keep up the proper equilibrium of health, owing to some DEFICIENCY of elements, whether they be fluids, gases, other secretions, or excrementitious matter, and she is compelled to manufacture these more largely from her own stores, by retaining or husbanding them. Man comes in again and says, 'I cannot allow this; Nature is acting contrary to all her own laws and all our dogmas; and, forsooth, all our authorities are outraged; this is disease of such and such a type, and I must force those actions which we see performed in health, but which are now in abeyance.' So, in both cases, he must necessarily interfere with the progress of natural cures. Therefore it seems evident that that which man thinks and believes to be disease is only Nature's efforts to rid herself of elements in excess on the one hand; or by

retaining them on the other, because they are wanted to make up deficiencies.

If we take this as a starting point, we have at least a basis to go upon. I say then; What do we know of disease? more especially when it is admitted by all the world, that the majority of small ailments of the body, and their name is legion, are attributed to some functional disturbance of 'THE LIVER;' and all, or nearly all the great diseases, to 'BLOOD POISON.' Now, before I go any further into this enquiry, I enter my protest against all such dogmas; as showing a great want of *à priori* philosophical reasoning.

II. I will take any individual life in its first stages and processes, and presume it to have a healthy standard. Such a state evidently implies progress with growth and the due exercise of all self-supporting principles within itself; and the due appropriation of foreign elements, whether atmospheric or gaseous, and of foreign ingesta, whether fluid or solid. There can be no doubt that every function and every duty which the body performs, are in some intimate connection, whether the parts be contiguous to, or distant from each other. Large instinctive sympathies predominate everywhere, connect every part, and moreover often show an influence of one part with another more particularly; even while the general whole is in sympathetic synchronism. Unless such a view be taken of the whole microcosm of the system; nothing but disunion can result. A divergence from this view seems to me, to have been the bane of all our treatment of disease. Everything has been more or less too distinctively considered; such as the Liver influence and Blood poison. These again, either separately or com-

bined, are supposed to produce some specific affections of given organs. It seems not to have occurred to physiologists, that they may have been produced by some want of integrity of neighbouring or even distant ones.

Would man have ever accumulated such a wonderful mass of diversity of opinion contained in books on specific diseases of organs; or devised the treatment of particular organs by specialists, who have taken them under their own care and adopted specific treatment; if far more rational and extended theories had been adopted? It is probable that this limited view taken of disease has given rise to those detestable offshoots; the Quacks and Nostrum-mongers of society. The practice of specialists often leads to this—that whether disease is or is not present in their favourite organs; it is almost their duty to make it appear there; or to attribute diseases to want of integrity of such parts, and so lead up to that point, where effects are treated and not the true causes.

I have looked most carefully through medical literature, and find one most remarkable stereotyped opinion in *all* European medical writers on disturbance of the stomach and primæ viæ, and more particularly of the colon, let that organ be active or passive; and I may sum up all these writers' opinions thus:—‘That the liver is in every point of view a very important organ in the treatment of EVERY DISEASE;—and one always in direct and important relation with the whole viscera of the body. The quantity of blood sent from it into the heart and lungs, causes the most frequent disturbance of these two great organs; and which is now *universally admitted* to arise from some disordered condition of its

functions, in not performing its duty on this great element on the one hand, or doing too much with it on the other, and so affecting the whole stream. That either the torpid or irritable state of the bowels at any time, in all persons young or old, must depend and can only depend on the state and condition of the bile and consequently on the liver, which produces or secretes it.' When I find the practice of medicine throughout Europe founded on such views; I cannot cease from opposing them. Giving, as all do, such dignity to such an organ as the liver; and such vital importance to the simple inorganic element it sends, as a mere diluent to that more vital organic one, the chyle.

If we are ever to get at the truth of what disease is and what it is not; what will cure it, and what will make it worse; we must begin to study natural laws more, and put less faith on dogmas, and the authority of schools. We constantly applaud Nature; we constantly say, when we have got into a dilemma, 'Well, Nature is a kind parent, let us wait and see what she will do.' This is the very time to notice what she does; but, singular enough, whatever Nature does which is glaringly opposed to received dogmas, she is treated as if she acted unwisely. If she throws off from or out of the system elements of a morbid character which oppress her; drugs are administered, which probably increase the morbid condition of those secretions, which she has just purged herself from; and, as a natural sequence, keep up the annoyance. If Nature is too active, and has gone beyond a wise discretion from the impetus, given to actions by great excitability of organs;—instead of arresting this, the excitement is increased, in order to carry off some supposed offending

cause ; and things are made worse. If she conserves elements on the other hand, and would recover the system by this means ; man will not allow it, because he knows much better than she does. All, then, that we seem to know of disease is simply the EFFECTS of Nature's *modus medendi*, and not the CAUSE of the disturbance. The cumbrous Nosologies framed at various times by learned men, in order to link a given number of effects, have led to a vast amount of erudition, and to an equally cumbrous amount of literature. For each deviation that can at all be typified by some defined name ; some authority and that authority's treatment, is quoted and held over us like a vampire. Whether it is cholera, fever, cerebral disorders, fits, epidemic or endemic diseases ; should there be the slightest variation in symptoms ; a host of theories, supposititious and conjectural, instantly arise on all the varieties and phases which any single cause may produce. If it rested here it would be but a plaything for *savans* ; but it unfortunately does not. Man must do something ; and that something is medical treatment. Then comes the discordant clashing of opinions ; every one of which has, no doubt, some fundamental basis to rest upon. For who amongst our ranks does not wish to do his best for his own fame, and doubly so for the honour of his profession and the good of his patient ? But it is this mode of proceeding which leads us astray. Before entering, therefore, on the consideration of disease ; let me ask my reader to disabuse his mind of all pedantry, and to ask himself a few simple questions.

III. What can be the true meaning of Idiosyncrasy ? Does this Idiosyncrasy produce the different phases of disease we see in every individual ? and, what are the

primary causes which produce the elements of disease, which the Idiosyncrasy of every individual regulates?

There can be no doubt that these three questions are most intimately blended; for this reason—that the same causes in different individuals produce different results. By this mode of getting at a fixed point we shall find that disease, in whatever organ it may show itself, is only a myth after all, and that when we can reach the cause of it we shall do better by attacking that cause, and thereby neutralise the effect produced.

Predominance of acid in the system is the natural standard for health; plus that, will show itself in a variety of ways. Let us suppose a super-acidity of the stomach; this may be relieved naturally by a fresh meal, which is always more or less an alkaloid mass, and therefore a medicine as well as a diet. Suppose it does not, it is only to assist it with a little carbonate of soda. Now in this first act of departure of health and of medication, there is yet a great point of physiology involved. A surplus acid state of the elements and contents of the stomach, naturally implies, that if these elements pass out into the duodenum, they give the bile in its alkaline capacity more to do. Now suppose this state has been allowed to continue over a given time; and the daily meals do not sufficiently neutralise these excesses, and they are not treated artificially by alkalis, and the bile not having sufficient alkaline power to neutralise these constant excesses,—it appears evident, that the first elementary conditions of chemico-vital life are greatly altered. Functional disturbances are not confined alone to these organs; because these natural excesses have been distributed everywhere throughout the whole body. The simple question

arises ; would it not be better to neutralise the excess of acid in the stomach, and so give the bile less to do ; than to depend upon the bile for doing almost an impossibility?

We will take for granted that there is generally a proper and due supply of elements sent to the liver to make bile, and that it is made of an ordinary quantity and quality ; yet nevertheless, there is an evident deficiency of alkaline element in the bile for the purpose now required. Are we, then, to say the liver is at fault ; and that it is torpid or lazy and a hundred other things which have been attributed to this organ ? Why should we seize hold of the second process, when the cause lay in the first, and is so easily set to rights ? Such principles evidently float in medical minds ; as shown by the chemists bringing to their notice a drug called ‘ PEP-SINE,’ which is designed to assist the stomach in some way in its primary actions, as it is manufactured from the stomach of animals. And as a stronger proof of this, I had lately sent to me a preparation of ‘ PAX-CREATINE ;’ guaranteed to possess all ‘ the properties of the pancreas of the pig.’ The label on the bottle being, ‘ One dose stirred in a glass of ginger wine or water, and taken directly after food, will digest the fat eaten at the meal, and render it easy of assimilation.’ So that the ‘ PEP-SINE ’ must evidently be designed to increase the natural acid digestive powers of the stomach ; and the ‘ PAX-CREATINE,’ to anticipate in the stomach the duty of the bile in the duodenum.

When I see the speculative medication of the seventeenth century, where the organs of animals celebrated for certain properties were prepared and prescribed to assist the shortcomings of similar organs in man, and now

find them imitated in the nineteenth century; I can but say there must be something wrong somewhere.

Nature directs us aright, if we only watch her more closely. In receiving a meal into the stomach she pours out all the acid she can from her own resources. Physiology knows this, as well as, that this is diluted with the acid bases of the saliva during active mastication. As digestion gets completed, the stomach ceases to secrete its gastric acid; and this act remains in abeyance, and, more than this; even an alkaline reaction takes place within it, as well as in the bases of the salivary salts, which fall continually into the stomach. Here, then, natural re-agents are set up, and these, from both sources, pass out through the pylorus and assist the alkaline biliary action in the duodenum. By a direct alkali, such as soda, we assist nature, and by combining this with sal volatile we even do more, and serve her,—for this reason; that though the first action of the sal volatile is alkaline, it becomes directly transformed by the elementary contents of the stomach into nitric acid. We therefore see all the first agencies at work, in keeping up electric actions by active effervescence and evolution of gases, which are immediately used again; and by the addition of the alkali a sudden relief of the system occurs, from evolution of fixed carbonic acid gas, which must be in excess, while from all these actions a greater amount of caloric ensues. The further result is also demonstrated, by the quicker transformation of the chyme into a better condition of chyle; and the fluid elements are more easily pressed in their contact with the sides of the small intestines through its membranes; while the solid matter is passed readily into the colon. Thus it is often seen that a dose of soda and sal volatile

will cause more fluid in the general mass of the fæces, and thus enable them to pass readily from the colon: or, as some would say, act as an aperient. There is not, however, the same action on the colon when this happens, as is occasioned by the aperients or cathartics. These excite it inordinately, and carry away the natural manure of the body in greater quantity and bulk, which is so prejudicial to life and health. In all this we see the simple process of being the handmaid to nature, instead of her opponent; and we gather from the simple laws of the alkaloid state of all fresh food, or the aid of an additional alkali after a meal, all we want to know. I do not therefore see the uses of such fanciful things as 'PEPSINE' and 'PANCREATINE,' which only encumber the practice of medicine and the pharmacopœia with a species of fashionable physicking. Suppose again from excess of the vital powers, which simply means excess of acid elements all over the body; every organ must have some excess, every mucous membrane be overloaded; all the inorganic elements must exist in greater quantities than are necessary; all the veins and their colleagues, the absorbents and lacteals, must be overworked; simply because every part is in the same state, and therefore greater activity existing everywhere. This condition cannot last long without the organic fluids becoming richer in basic elements. Now the object to be attained by art is, to reduce the inorganic elements to a more normal state, and, as a matter of certainty, everything else will follow in the same train, by the simple wear and tear and exhaustion of them. But if the organic elements are attacked first; nature is thrown out of gear directly. If, instead of correcting primary causes so beautifully distinct; cathartics are used to unload the bowels and the mercurials given to

act on what is vulgarly called a sluggish liver,—it is evident that everything is at once made worse.

In all these cases the great law of idiosyncrasy makes its appearance. Everyone has some one organ weaker than another. One, two, or three gradations of a super-acid state, over the natural predominance, may produce in different individuals different effects. A, never has this state, but he gets a sore throat: B, gets sore eyes: C, gets a congestive cough, from these excesses fixing themselves on the bronchial tubes: D, gets a headache, or what is called a sick headache: E, a rheumatism in some favourite spot; and so every man's peccant part is found out. These facts may be multiplied indefinitely, but they are sufficient for a brief illustration of my meaning.

Now from what is seen in the great art and mystery of medicine; we find all these simple causes, of the most primary character, attributed to some functional disturbance of one organ, and that the liver. Should the bowels, however, be in the least irregular, which they are sure to be, some cathartic is administered; and even if they are not, the prevailing idea throughout the whole medical profession, as well as the public, is, that the bowels must, in some manner or other, be treated or acted upon;—mercury or podophyllum (this is the latest fashion) for the liver, and cathartics for the bowels. So that that which would have yielded to the most simple remedies, is made worse by drug poisoning on the one hand, and removing elements from the system on the other, which are necessary to the vital integrity of the whole body. No sooner has the system been brought into a false state, than the patient's complaints, at first most simple, become more manifold and then

occult. He had but one or two small causes of derangement before; but now he has fifty, which every day become more and more complicated, and he goes, according to the capacity of his pocket, to the first authorities, and never gets two opinions alike, or any similarity of medical treatment or diet.

Having shown the first divergence from the healthy standard, and how it is treated by nature according to the idiosyncrasy of each person, and to her own great relief, and which process might be followed if we could once be brought to look at everything through a simple medium; I will still follow natural disturbances and their laws.

First, then, we must always bear in mind the idiosyncrasy of each individual in whatever complaint he may be suffering from. For this reason, that the same disorder is typified under different characters in every separate person. Hence has arisen one of the great questions of the day—of disease having altered its type! Why, it is as clear as the sun at noon-day that this is nothing new—from the facts I have just mentioned. Therefore, when man was less civilised, and the earth less cultivated and drained, a more barbarous condition would naturally imply a higher and more favourable opportunity for any natural disorder to run a different course. Therefore those who recorded its spread, of whatever character it might have been; recorded things which we do not see now unless from certain causes; the states, modes of living, habits, &c., approaching that of a former epoch, or resembling nearly the same conditions. It would be very hard, indeed, if better diet, cleaner habits, greater salubrity of the earth's surface and of our dwellings; if they did not

show this in the mitigation of the attacks of particular forms of disease, which once were very virulent, but now very mild. Therefore it requires very few words to show, that disease alters its type under certain circumstances; equally as that disease is altered in its character by the idiosyncrasy of every individual. But there is another point in this matter which has been overlooked, and that is, the predisposition of individuals to disease, whatever that may be.

I have said that man is a self-supporting animal; that he makes four-fifths of his own vital powers within himself, and only wants one-fifth raw material, which includes all he takes by the mouth, as well as what is furnished to him by the oxygen of the air. Furthermore, that he is the greatest poison generator under the sun. He lives by his poisons—in fact, he could not live without them; and, when they get the upper hand for want of opposing powers; he dies from them. This is a curious question, but it is nevertheless the true one. If a man comes under the influence of aerial miasmata; it is only that it is something added to what he generates himself, the virulence of his own poisons receiving greater force and power. So little is known of this, that medical treatment is just as likely to make him worse as better, because the vital laws of the gases have been entirely ignored. We see an epidemic sweeping over a given community, and only a certain percentage of that community seized; while a certain percentage of those seized will die, and the rest recover. Here, then, come two forces into the field: predisposition on the one hand, which is nothing more nor less than the fact of increase of his own morbid poisons; while his own idiosyncrasy regulates which organs shall be

most affected. These two combined, illustrate a divergence of exactness in every particular case, though the general appearance shall be similar. This is quite enough to show alteration of character, and quite enough to give *savans* the scope to particularise each divergence and endless ramifications or effects, produced from but a very few simple causes. For, whatever may arise, either from the peculiarly altered conditions of everyone's secretions—whether they be plus that which life requires, or deficient in what it wants—dissimilarity in some point must occur as a matter of course. Instead, therefore, of all the intricacies of change of these, and the idiosyncrasies of individuals which help to produce them, being the great end in view to discriminate and determine upon—and their name is legion—the great object should be to find out the fundamental or morbid cause or causes of these, so as to direct medical agents to correct, on the one hand, any excess of vital principle; or, on the other; to add those of which the system is deficient. We then put all our treatment into a nutshell; for, when these have been determined and known as fixed laws, the whole body of the profession would be found doing the very same thing without a difference of opinion; or only that which would incline to the administration of one of two elements having nearly or precisely the same character and action. But now, whenever effect is treated, instead of its cause, our disunion in opinion in giving perfectly opposite remedies is marvellous; and it is this very fact which produces the disunion amongst ourselves; our mental prostration to dogmas of authorities and schools; our repudiation by the public of being of any use at all, except to make things worse than we

found them, and a thousand other things which we have righteously deserved. All which come from the greater development of erudition and display in complicating everything; whilst a little reflection is alone wanted to make all these things clearer and more satisfactory.

IV. Nosology having classed diseases more from their symptoms than their real causes; let us consider how this classification can be effected from their causes alone.

Diseases may be classed as much by the remedies we use for them, as from any nosological arrangement. The two great divisions are those which occur from excess of vital actions; and those which arise from deficient vital powers. Let us look at these, and we shall find a great principle, even from the first germ of animal life. Here, as I have previously said, the inorganic elements predominate, the same as they do in vegetation, and, like vegetation, sustain the smaller percentage of organic properties. When it bursts into a separate existence the same facts occur. Excess over the predominance of a given power, which constitutes the law of healthy life, produces in infancy the tendency to eruptive actions, and we see the Red gum (*Strophulus intertinctus*) or White gum (*S. albidus*). The natural law, therefore, of infant life is a bias towards excess of power. If we attack this by aperients, we attack organic elements, and reduce them, and so weaken the balance; but if we correct by magnesia or any other moderate alkali, we relieve excess of inorganic elements, which caused the excess of vital powers. Therefore, we plainly see, or rather ought to do so, that excess of acid soon occurs over the natural predominance absolutely necessary to uphold the

chemico-vital laws of life. We find nature doing pretty much the same thing in the healthy infant, by its vomiting heavy crude curds after a meal, especially if the parent's milk is rich and good. The stomachs of infants are not digestive organs, but merely gangways; and the small amount of rennet or acid this gangway affords, shows the feeble effort at first processes of digestion. If the infant retained, instead of vomiting this curd, and it passed the pylorus; then its troubles begin, by having all those gripings, flatulences, and malaise, not amounting to disease, but pure functional disturbance amongst all the fluids and gases. These distend the alimentary tube, press upon nerve matter, and cause pain. If the milk is poor, and no curd forms in any quantity, the child does not thrive, simply because its delicate organisms are not nourished, in fact no gases are formed in the colon, because the fæces are not rich enough to generate them. The tissues and other organs are called upon to perform duties, which they cannot do. Again, the infant liver has to be conducted in its uses by secreting bile, in order to saponify the oily matter of milk; and the golden colour of its fæces, mixed with slight curdy pieces, show the first step of its beautiful performance. The small intestines take up the small amount of organic chyle, and the colon, even now rich enough in hydrogen, which by exosmose soon penetrates its delicate porous structures, meeting with the oxygen, makes inorganic fluid elements, and these becoming inspissated, fat is deposited. Satisfied, it sleeps the sleep of infancy; but when we come to disturb this natural state by aperients; we remove the hydrogen with the fæces, and the little patient, unable to resist the oxygen, pines and wastes. In the infant state we can soon discern its idiosyncrasy;

for if it generates hydrogen rapidly, and in quantity, it needs no aperients, for its bowels are regular. If it wants the hydrogen, it retains its fæces, and is what is called a 'bound' child, that is, a costive one. Its nature is then only obeying a simple law to get inorganic lubricating fluids, upon that beautiful physiological basis I have already laid down. We wait awhile, and watch for its little infantile diseases, which will be seen to arise from super-vital actions. It will show a disposition to the pock eruptions: chicken-pock, glass-pock, and other little pimply tribes. It will also show measly eruptions; that is a form of super-vital action coupled with an inflammatory or infra-vital state; yet not to be classed with these latter, as has been hitherto done by all authors; but with the purely congestive, or when the inorganic elements are in excess. There are many functional disturbances of a small character also, which are to be classed in this way; such as all tendencies to a higher secretive condition of the mucous membranes, wherever situated, with lessened power of excretion. So that it is easy to understand the laws of colds, with sneezing, hiccoughs, &c.; coughs from over-loaded air ducts; croup, from the mucus becoming organised about the trachea—all arising from such like disposition of these membranes, to secrete and retain on their surfaces in greater quantity, than they have power to throw off or excrete them. Hence the advantage to be derived from a greater supply of oxygen, because it is, as I have said, an element which is an oxydiser or wearer out of tissues, producing in this action a great evolution of gases; but which associate again or mix with others, principally with the hydrogens, which combination becomes again a food to the living body. Therefore, all that assists in this,

assists the action of oxygen, and we find in all these conditions the best medical applications are the alkalies, and the alkaloids and pure air; whilst diet of a superior kind is called for, because it also uses up an immense quantity of the inorganic elements, so produced, which aids in the reduction of their excess; for food in these cases is equally a medicine as it is a diet. No medication for these states, even if rightly administered, should be unaccompanied by generous diet;—for this reason, that if you correct or reduce super-vital life and do not aid new actions, the organic elements have to stand in the gap, and they become lessened, and Nature soon points out to the physician that he is wrong in lowering organic vital power, and by doing, so affecting the first principles of life. We see from this little sketch that the inorganic elements are in excess in all the primary diseases, and that the gases generated in the body, not finding sufficient oxygen, the system becomes poisoned. How much better, then, to neutralise them with their opposites, than to attempt to carry them away altogether! The accumulation of morbid products on the mucous membranes of the alimentary canal and bronchial tubes, as well as wherever mucous membranes are situated, always show super-vital actions; and these are the electric, the calorific, and the gaseous. Now it has been always considered that infant life, wherever it exists, is subject to small-pox, and that vaccination opposes this subtle poison. I have shown how the smaller poek-tribes are caused, and small-pox is only an aggravation of them. I have also for many years been of opinion that some day, when all these matters are better understood, prophylactic measures will be found surer agents than vaccination, for neu-

tralisising the natural poisons induced by all such super-vital actions in the system. But let us look at small-pox, and ask ourselves, how this disease is produced. I will illustrate it thus: Nature is over-stored and over-stocked by excess of both organic and inorganic elements, and her only way of getting rid of them is by their expulsion to the surface of the body, and on the mucons membranes of the alimentary canal. Thus it is, that aggregate matter forms at all points of the excretory ducts, which, by given laws of morbid products, produce pustular vesicles. When Nature has done this; she has in fact attained her end, that of relieving the whole system from oppression. We, however, see this differently, and cannot admit it as a simple effect; so we make a disease of it; and if we look through medical literature, from the earliest period to the present time, we shall, in our reflecting moments, be shocked at what we read. Given a subject of small-pox, however mild, however virulent it may be; Nature has simply done her duty, and all that we are called upon to do is to help her. That which offers itself first to our consideration is the general disturbance in the system, and what I may call the robbery which has taken place from sudden losses of power. It is impossible to imagine that such quantities of morbid elements could have been thrown off without carrying with them many useful ones; and it is equally impossible to suppose but that every pustule forming an inroad into, and actually destroying, a healthy substance or spot; that this must be made good again. If it is not, we see those unsightly marks which proclaim for ever where the destructive pock once existed. But if these are properly supplied with elements of

reconstruction, they are filled up, and leave no trace of their former existence.

Taking this view, then ;—that morbid elements have been expelled, and that each pock has occupied a space which has been more or less destroyed ; that desquamation has taken place, and in that desquamation a scab has formed, but the part beneath has never been reconstructed. It follows as a sequitur to say, suppose this could have been done, as it is done very often, naturally, in vigorous bodies ; whilst in others less so, and therefore, a pit or cavity is formed ; it then resolves itself into a simple question of supply to accomplish this end, and which can only be done by the *vis a tergo* of fresh forces and powers. Therefore the better the diet, both in quantity and quality, the better this can be accomplished. Presuming, therefore, that every organ has been relieved from some pressure of excess of vital elements, and the system is now better able to receive nourishment than ever ; the best medicine seems to be rump-steaks and porter or their equivalents. The last cases of this kind occurring in my own practice were fully put to this test. Three children, aged seven, five, and three years, were attacked with confluent small-pox ; so that there was not an eighth of an inch of surface anywhere throughout their bodies unoccupied by the pustules. They were kept in one large bed, in a well-ventilated, *but darkened room*. Their consumption of rump-steaks and porter was prodigious. They took during the night alone between them a pound of rump-steak and a quart of porter. In the irritable stage of the pock ; they were smeared with sweet oil, alternately with Goulard water, which was very grateful. I kept their bowels con-

served, and gave them mineral tonics with anodynes; because the inorganic elements having been inordinately reduced, were required to aid and assist the rump steaks and porter. Their recovery was complete in the due time of this disease; neither of them showing the smallest sign of pitting on any part of their bodies. The youngest, three months afterwards, was admired by a lady for its marble hardness and plumpness of its whole surface. Some of my medical friends who have carried out this plan in their own practice, have been gratified at the beautiful recovery of their patients without a blemish. The truth is simply told, the *vis a tergo* of the vital forces was duly supplied and all the gaps were filled up. On the other hand, let us reason upon a contrary system, viz. to starve, or keep on a low diet and the use of cathartics, &c. Where are reconstructive elements to come from, to fill up every pock cavity which has held suppurative matter? Purge; and how are the vital gases to be made again? Where can hydrogens come from, to resist the oxydation of the atmosphere? Give as much bland fluid for thirst as is demanded; the system then cannot get inorganic fluid elements sufficient to keep down fever or inflammatory heat. Here, then, the physiology I have adduced comes boldly forward, bearing its truth with it. What we have seen has been only Nature's effort to cure by relieving the system of an incubus. We look upon these acts as disease; and would lower and purge more. When this is done, one of three things must happen:—the patient is either so strong within himself as to furnish elements of reconstruction against all opposition, and so recovers; or, secondly, by this low diet and physicking, should

the patient live, having still vital power to do so, he becomes marked for life; or, thirdly, being unable to resist the bold act of Nature, combined with the unwise practice of man; or if too poor to get the nourishment required, the body sinks exhausted, and dies. So that the child of the rich may be destroyed from a mistaken physiology of the disease and its treatment; and the poor man's child because it cannot get sufficient food. In scores of instances I have heard from the lips of the poor; that when their children had small-pox, and they were unable to pay for medical advice, the little things cried so for food that they could not find it in their hearts not to give it to them; and so they got over it unscathed and unmarked. Why cannot physiology learn a lesson from this? I place the whole matter on a truthful basis. I have observed, and I have learnt, and I have just reason to draw the conclusions I do. All these cases of super-vital life, beginning from the lowest and ending with the highest, in small-pox; show that our bodies depend upon themselves, and on the very poisons they generate in the form of gases, for life itself. No vaccination, even if it continues an institution for a thousand years, will ever eradicate the germ of our first poisons, generated by ourselves, of which small-pox is the greatest type; however much it may control it as an opponent. As long as human nature continues as such, and it must do so to the end of the world as it has done from the beginning of man's epoch thereon; it must always be the same, and that each individual as it is born, and obeys the laws of growth, will obey also the same laws of matter, having the same principles of life. It is the more perfect knowledge of physiology which is left us

to attain, and in learning this, to devise wiser and simpler means of controlling the elements of the body, if they get out of that given tract, which produces disease, to bring them again into that given law, which produces health. It is in vain that we search and dive into the minutiae of matter,—we cannot understand its workings. It is far better in our present knowledge to search for general laws and draw simple conclusions, which even the most ignorant can apply.

Therefore in classifying diseases by their remedies we are more likely to get a more simple nosology, and to understand how Nature acts in relieving herself of morbid elementary matter. We are also more likely to get a simple starting point for all bases of action, and to find out why it is that an apparently similar disease in two distinct individuals; that one shall be relieved, nay, cured by a certain formula and process; and the other made worse by it. These points may be hard to understand, yet I believe they will be hereafter better elucidated when more scientific principles become developed.

V. I have spoken of certain natural actions which we are accustomed to call disease in infant life, to show how super-vital powers accumulate as a law in the system, and become the first cause of departure from the healthy standard. Also, to show, that the richer both the organic and inorganic elements become, the more poisonous they are, and being heaped up like fuel, require only some natural or adventitious spark to declare a form of natural direction to get rid of them. Also, that by a reduction or correction by their opposites by prophylactic remedies, their characters are destroyed, and the elements which are the result of this

can be used again for the vital acts of life. Also, that when this is done, the system recovers quickly, because it has not been weakened of its organic forces.

The deductions to be made from all these facts prove, that it is most untrue to assert, that many of these diseases arise from '*blood-poisons*,' when we see they are as much poisons in the inorganic elements as in the organic. But when I see the best authorities advising and prescribing their total expulsion from the system by powerful drngs of a cathartic character, which not only take away the really offending matter or *causa mala*; but also carry away organic elements, which the system cannot spare. Or, on the other hand, by prescribing mercurials and other preparations called alteratives or absorbents, so as to completely alter all the natural elements and complicate their chemico-vital character; I felt bound to differ, and search for those laws which regulate life and health. As what I have said relates only to infant life; let me now speak of adult life, and ask if similar natural laws do not obtain, though we now see different phases in them? Thus, when the system is young, and all the organs of the body are systematically disturbed by mere functional derangement, we see only very simple actions which I have already stated; but in adult life, these same laws have different results. A thousand circumstances have altered the process and progress of natural operations. Many small ailments may have weakened specific organs; many acts of conventional life and usages of an artificial state of society, have affected some more than others; many imprudences, excesses, as well as deficiencies, have occurred to injure and weaken the powers generally. All these and more have had their effects

on the general state of the whole body ; so that, in different idiosyncrasies, different effects are seen from the same train of causes. Thus, super-vital or congestive actions, instead of being general, as in infant life, are now concentrated into a disease or disturbance of one given organ. So that it is only a question of idiosyncrasy, or the peccant or weak part of the individual, which exhibits the greatest amount of functional disturbance. This is the first stumbling-block that falls in the way of the 'ARS MEDICINÆ.' The effect is treated, instead of the cause. For let any specific organ be found most affected, a dead set is immediately made upon it. Hence we have such a host of authorities, on the best means of treating specific disorders or diseases of given organs. The first parts considered and asked about are the bowels ; but the first organ specifically treated is the liver. All natural actions and secretions, of whatever kind they may be, whether organic or inorganic, are in some manner altered in their character by a false system of drugging. Some, which should have been simply neutralised, are absorbed ; and others, which should have been retained, are carried away ; so that the chemico-vital balance is destroyed. Those which are retained, not having their natural antagonists to convert them into innocuous elements, become consequently noxious ones ; and Nature, having been deprived of the beneficial uses of those which have been carried away so fearlessly and wantonly, soon becomes depressed and exhausted. The disease and the *modus medendi* now assume a most complicated character ; for we frequently see these cases baffling all art, simply because all natural laws have been subverted. It is, therefore, of the first importance to diagnose the

general state of the secretions, to ascertain whether the system is in a super-vital, or congestive, or acid state. If it should be found to be so, then correction of this state by all those mild and gentle remedies, the alkalies, should be the plan pursued. By doing this, that great mass coming under the denomination of the inorganic elements is reduced to a more healthy standard; whilst the organic elements, influenced in a large degree by any sudden disturbance and alteration in the inorganic, become relieved of their richer properties, and not affected in their vital duties. In due time, and with judicious care, the specific organ having, as all organs have, specific duties of their own; though at all times subordinate to the whole structure, is brought to its normal state. But it may so happen, that the general condition of the system shall exhibit a super-vital predominance, while the one organ, whichever it may be that is most affected, shall be in an inflammatory state; which is nothing more nor less than an infra-vital condition, which requires a lost element to be supplied to the system, and through this to that organ itself. Here, then, comes a second stumbling-block; yet it is easily got over. It simply arises from the fact that this organ has, from former disease, or from the peculiar character of the individual and his idiosyncrasy, been already a tender one, and has parted with its vital balance quicker than all the others. It is also a singular disposition in the laws of the vital elements, that when this fact becomes demonstrable in one organ, as showing an inflammatory disposition, that the system is liable to this condition, and it is thus shown in the most peccant organ. There is also this beautiful law; that every other organ seems to be relieved at the expense of this one.

and Nature points out to them, the duty of assisting their neighbour to recover its integrity. Here, then, although super-vital powers shall predominate generally; they may yet be incapable of affording natural aid to their neighbour which has lost this character. Art, properly directed, should now assist the system towards restoration. If, then, the mineral acids are administered, and opiates are given to arrest natural secretions, so that they may also eliminate similar ones, the inflammatory organ soon recovers its integrity, and the patient gets well.

Throughout medical literature, there is no physiological explanation given to the action of drugs, on certain states of the secretions producing disease. There are cases given, with all the circumstances attending them; such-and-such treatment having been adopted, and the result stated;—but from the beginning to the end, no natural laws are detailed to account for the disease, and no human laws for the treatment. No one can make anything of these cases. They carry with them no information for any similar treatment in any apparently similar state; while we all know they would have been treated differently in every hand they had fallen into; so they resolve themselves into simple matters of personal experience. Throughout all our hospitals; it is in vain that students follow the heels of their physicians to learn a practice of medicine. If they ask questions why distinct alkaline or distinct acid medicines are given; they get either a vague reply, or none at all. Whether the one is to correct or lessen super-vital powers, and by the other to add to them, which they distinctly do. Yet these two most opposite causes of disease, and their most opposite remedies, form the

great landmarks to be distinctively known and pointed out. We see, however, that these very distinct medicines are not administered with anything like a precision of action ; but according to the private judgment of every man ; and the one as often given instead of the other, to the prejudice of the patient, and the wonder that he does not get better ; nay, that he gets worse. Here, then, I contend, that we ought to learn much of the state of the secretions and the character of the disease ; which their vitiated forms produce, from the very medicines we use to alleviate them.

We find in the adult, abundant food for speculation in the diagnosis of disease, as well as its treatment. A seeking to find something specific and an equally specific remedy : the right remedy being one of the most accidental of circumstances, instead of being under a given law, that nothing but that, could possibly be prescribed with advantage. This is what I contend for—to prescribe for the cause, and not the effect. Once make this the great law of medicine, and all the rest will follow ; while disease itself, wherever it may impinge, will be found, in a large percentage of cases, mythical. If we search for the true reasons of the greater number of erratic pains about the body ; whether in the abdomen, the head, or the external members, we shall find them arising more from super-vital or congestive states, than the reverse or inflammatory. I may be stating what is not orthodox, nor anything like it recorded in medical literature, when I say, that there is little or no pain arising from inflammation of mucous membranes. There is no pain felt in bronchitis, when all the bronchial tubes are inflamed ; neither is there in trachitis or tonsillitis, nor muco-enteritis. In the height of scarlet

fever, when the eruption is fullest, the whole mucous membrane, from mouth to anus, including all the respiratory organs, will be in an inflammatory condition. Are abdominal pains the prevailing feature of such a case ; or even when distinct mucro-enteritis exists to its fullest extent ? I do not know an author that has ever said so ; though I have known intelligent men wonder why it was not so ; when the fact has been brought to their notice. I have seen colitis, and after death found the colon riddled like a sieve with ulcerations : the bursting of some of which had been the immediate cause of death : yet, during life, not the slightest pain was evinced, not even by a rough hand in taxis. But let the smallest amount of inflammation arise in serous membraues ; the pains are then intolerable. If we have pains in the interior structures, and they are not traced to sero-membranous inflammation, depend on it they arise from congestive causes producing flatus ; and this flatus, distending the alimentary tube, more at given parts than at others, and being somewhat erratic, will impinge on those parts most affected, and, by pressure on nerve matter, produce pain.

Pains between the shoulders or on the sternum, which have been freely attributed to the liver ; may be traced to a congestive or overloaded state of the bronchial tubes through pressure on nerves. The same will occur in all muscles on the pressure of excess of the inorganic or lubricating fluids between their fibres, or in joints ; which we designate rheumatic pains. Here, again, the adult will suffer when infancy would not ; simply because some established processes in the direction of the secretions in their morbid states, have been previously set up. Thus we see plainly, that there are conditions

of body forced by a peculiar idiosyncrasy into certain laws. For instance, a congestive condition, everywhere but in the lungs, which will show an inflammation on their membranes or bronchitis. While, on the other hand, another, whose habit has tended to a congested state of the bronchial tubes, which after many attacks, and as many natural or artificial reliefs; at last progresses into another stage, and that is pleurisy. If bronchitis succeeds to bronchial congestion, from the rapidity with which Nature has relieved the tubes of their excessive secretions and left them bare; these two disorders will be peculiar to that individual. On the other hand; another will have pleurisy succeed the bronchial congestion, and he cannot have the former without having been insidiously a subject of the latter; which arises from the air, in the terminal extremities of the bronchial tubes, penetrating the pleura pulmonalis. This serous membrane then becomes affected. We see pleuritis often enough; but no one has ever satisfactorily accounted for its presence there. Inflammation may come anywhere; but science is very vague at present on how it happens in the natural state of things. For myself, I can but give my own deductions on sero-membranous inflammations.--that they cannot exist except through primary disordered or disintegrated states of the mucous membranes. The highly sympathetic condition of every part of the body, must never be left out of the calculation, in the causes which lead up to any given part being affected. Peritonitis must first be caused by muco-membranous disturbance. It is strange, that this fact has not been traced; the sequences are so exceedingly clear and simple. Given an inflammation; a wound, a fracture, an amputation, or

any other most serious disturbance of any part or joints of the lower extremities ;— the absorbents, the lacteals, the veins, the neurilemma of nerves, the coats of arteries, will all become most highly sensitive. If these are not subdued, and inflammation traverses upwards ; the first parts of the abdomen which become sympathetically affected, will be the mucous membrane of the *colon* : next to this, the peritoneum ; but not the peritoneum before the mucous membrane of the colon.

If prophylactic remedies are to benefit this state, and prevent the peritoneum from being affected, they must be given while the inflammation is muco-membranous ; and if not, then those fatal words must be pronounced, ‘ *too late.*’ When peritonitis sets in after severe operations, there is then small hope. Singular enough, there is no expressed form of diagnosis, recorded in medical literature, that can pronounce upon the advent of peritonitis. It is not known till it has existed for at least forty-eight to seventy-two hours. Then nobody can mistake it. Here, again, peritonitis never kills. The next stage that follows, by a law of sympathy ; is from peritonitis to bronchitis ; a sero-membranous to a muco-membranous inflammation ; and then again pneumonia ; or from a muco-membranous to a sero-membranous inflammation ; by the same laws that peritonitis followed colitis. When pneumonia has set in ; witness the dyspnoea, and all the attendant symptoms of this disease ; and it will be found, as true as natural laws can be laid down, that the patient dies of pneumonia, as a legitimate sequitur to peritonitis. I have thus shown that adult disease is greatly influenced by many adventitious circumstances ; and further illustrated not only the peculiar idiosyncrasy of every individual favouring

the development of disease at one particular part or organ; but I have trodden on that most wonderful ground, the law of sympathies, between every organ of the body. If, then, I have shown, both physiologically and medically, that super-vital actions in the system, which are super-acid ones, are to be corrected by alkalis; it must follow, that if inflammations arise and are their very opposites, that they are infra-vital ones, and, as a matter of course, require the acid or mineral tonics.

If physicians would only observe these facts; they would see how Nature behaves in her endeavour to restore the lost power. She hushes every secretion; she checks every inordinate action; she locks up and conserves the elements in the colon, in order to get hydrogen gases to resist the wearing influence of the oxygen, and she does this to make fluid inorganic elements; thus storing her self-supporting principles and powers, to get from all these resources elements which have been lost.

VI. Let me further illustrate this subject by some of the common diseases which come under our notice; showing how our noble art, practised now only by all men's different experiences, can be made to ascend the scale, and develop itself into a science; simply from greater unanimity on great cardinal points.

We must first bear in mind that all diseases from super-vital or acid actions, show in their natural cure, great tendencies to combustion of elements,—sometimes slowly, sometimes with virulence; so that Nature, wanting to rid herself of these in any given part, causes greater heat in these parts. The lowest and most common act of this kind is from some undigested food in the stomach. The gastric acid will then become

more powerful, and the caloric increased. There is not a daily usage in life that does not speak the same truth. The very fact of filling the stomach with a fresh meal causes combustion and greater heat; this is further increased by our taking beer, or wine, or spirits, with our meals,—the latter more especially after anything rich, such as goose, duck, roast pork, &c.; again, the warmth of the peppers, mustard, &c., which we take with certain viands more than with others. If we even took these usages into greater consideration, we should see great physiological principles in them; the object being to produce additional caloric or some additional effervescent or destroying action. If we take the derivation of some of our terms used in medicine; we shall find a singular coincidence in the monosyllable 'Cal,' or 'Kal'; which in the Hindoo mythology means fire; KALI, the wife of SIVA, was the Hindoo God of Fire, or, as he is called, 'THE GREAT DESTROYER AND REPRODUCER.' We use the term '*cal-cine*,' or '*kal-cine*,' to burn; '*cal-oric*,' or '*kal-oric*,' meaning heat. It is easy to trace from these the chemical term '*kal-i*,' or '*al-kal-i*.' Even the ancient term of '*cal-iph*,' or '*kal-iph*,' seems lost in the dust of early time. It meant, when first adopted by the successors of Mahomet, vice-god, or representative of God on earth; which came thousands of years before this era from the fire worshippers of the East; the sun or fire being their god. The derivation of 'kali' seems lost to literature; vide the ancients on the search after the philosopher's stone.

Now we all know that acids and alkalies will produce effervescence, and, at certain times and places, great heat. Witness the taking a little carbonate of soda on an extremely acid condition of stomach; the immediate

effervescence which ensues, often accompanied by a great disengagement of carbonic acid gas through the mouth. Here, then, is a simple illustration of caloric being produced, and here also the correction of a super-vital excess: first, a destroyer, with the additional heat from effervescence, which often removes in a simple manner the primary causes. It will immediately occur to many, that as this is so well known a fact, that if alkalis be given in the opposite state to that which is required, that they must be injurious; and so they are. I shall be reminded, perhaps, on the value the Faculty set upon ammonia in scarlet fever. Let me tell them that the alkali of this drug becomes changed, directly it is taken into the stomach, into *nitric acid*; so that if they see a beneficial action arise, it is from this cause, and they might as well have acted more scientifically, and given the acid itself first.

I have merely shown the processes, which follow the administration of two drugs of distinctly opposite characters: the one to reduce an excess, and the other to add or give to the system an element of which it may be deficient. Having stated so much: my next object is to show, that these two distinct states in the system will produce somewhat similar affections, but which have never been properly distinguished; so that, the profession have been often misled in their treatment of them, through giving the one of these distinctive remedies instead of the other. Curious enough, nothing is so confused in medical literature as this. That we may have congestive as well as inflammatory conghs, rheumatism, gout, cholera, fever, and a thousand other things, which only require the smallest discrimination to detect the difference, and by doing so, to relieve them

more effectually. But, in the absence of this simple rudimentary knowledge, cases are often complicated. For the more alkalies are given in inflammatory gout and rheumatism, &c., the worse things become; and it has, no doubt, often appeared strange, when, in certain depressed conditions, these inflammatory cases have been treated for general debility, and what are called nervous pains, and that quinine and iron have been prescribed. The patient, getting better from these; attributes great genius to his medical adviser; when it has, no doubt surprised him as much as it has gratified the other. Now, if any science had entered at all into the calculation; the more expensive drugs, such as quinine and iron, might have been dispensed with, and a simple mineral or acid tonic, with an anodyne, would have done all that was necessary. All this shows the want of distinct laws, and the fallacy of dogmas which are our inheritance, from which we appear to have no escape.

Many now who write, are prone to show their learning in imitation of the ancients, by the coining of hard words in order to dignify some new symptom in disease. The consequence will be; that some day, our nomenclature of disease will assume a proportion which our memories will never be able to grasp. Thus, gout, considered by old worthies, arose from morbid, peccant, phlegmatic, scorbutic, distempered conditions and humours; fermentation of the blood, corrosive humours, mixed with phlegm and choler, and numberless other phrases. Again, wherever the attack came, there were the specific names ready at hand: if the foot, Podagra; if the hands, Chiragra; if the knee, Gonagra; if the shoulder, Ischias, or Dolor Ischiadicus; if at several

parts at once, Arthritis ; if the hip, Sciatick. It is all this that I now see so largely imitated ; and even while all these new names for diseases of distinct parts are given to us, they seem to add nothing to the science of cure. I find the very facts overlooked, which I am now endeavouring to show, that every disease in distinct parts will bear the character of the congestive or the inflammatory ; so that, if the names are to have weight, there should be only two of them. Precisely the same as we use the terms ‘ bronchial congestion ’ and ‘ bronchitis,’ which are totally different affections, and as diametrically opposite remedies required for them. So also with congestive rheumatism, or inflammatory rheumatism, &c.—in all these cases there is as much distinction as there is between the two opposite drugs, carbonate of soda and sulphuric acid.

VII. I will now speak of inflammation, in which I include all cases of inflammatory actions ; whatever character they may assume, but which produce in the system, more or less a febrile tendency ; also all cases where sudden damages are to be repaired, or reconstruction to be carried on.

Inflammatory actions never exist, without destroying the balance of the inorganic and organic fluid elements in the system. In fact, as heat and thirst prevail, there must evidently be a drought ; this drought therefore shows, that the natural inorganic fluids of the body are below par. The organic elements may remain in the same proportion, but the inorganic are considerably lessened. The very first natural acts shown in these states are conservative ; in order to get these elements again. Thus, perspiration ceases, urinary secretions are lessened, and constipation of the colon ensues. No

amount of foreign fluid taken into the system, can possibly supply what it now requires. Therefore, the conclusion must necessarily arise, that Nature herself is unable to make up the quantity for the due lubrication of her machinery or to support the chemico-vital principles of life. It is evident that the three great conservative actions mentioned above are known to all medical authorities, including also the veterinary. Because, directly they occur, they all exclaim, ‘Get a secretion on the skin!’ ‘Get the kidneys and bowels to act!’ The more these unnatural acts are pursued by equally unnatural means, the further off is the wished-for result. To say that these make matters worse, is the mildest expression that can be used. From the disappointment often experienced in trying to effect these objects, the great wonder has appeared to me, that the physiology of Nature has not been more deeply studied. There have existed in every generation of men practising medicine, keen observers, who have said, ‘Do not give aperients in fevers:’ yet they will give medicines which in ordinary circumstances, when inflammation does not exist, will produce renal actions and perspiration, but fail to do so when inflammation is present.

In our own day; men who have got some credit for their works on fever have said, ‘We seldom see any benefit arising from cathartics in fever, nay, we have often seen great evil arise; better then leave a little constipation to *some natural law*, it seldom does an injury to the system.’ Again, ‘Pneumonia is none the worse for having allowed some conservancy of the bowels.’ But inasmuch as these are only opinions, backed up and supported by no law; other writers, equally esteemed,

advocate aperients ; and will show cause for doing so, by a number of cases where absolute benefit is proved to have resulted by the proceeding ; while in a few they are candid enough to admit the reverse. This touches on my last section ; for it may so happen, that the fevers thus treated have been congestive, and could stand this treatment to a certain extent ; while, on the other hand, the authors who deery aperients may have had more purely inflammatory ones. But, inasmuch as neither party knew the difference between the two ; the dogmas of both sects are seen to be only their opinions ; totally unconnected with any physiological law whatever. If as physiologists have said, that the body depended upon the blood for all its moisture, why does it not supply this now, in its utmost need, when its organic elements remain the same and even totally unimpaired ? Simply because the inorganic fluids are made from totally different sources. Nature not being able to supply fluid diluents to the organic reconstructing elements, she retains in the system all those which she wants for these purposes : but which the Faculty try all they can to carry away. This, forsooth, is called physiology, and the scientific practice of medicine ; when it is neither the one nor the other.

Nothing shows the truth of these remarks more than the dreadful pestilence called the Rinderpest, which has lately, with its '*scientific stamping out*,' carried off millions of cattle, and caused millions of money to be lost. I am in possession of the Government Report on this disease ; and a wonderful production it is. It is a great lock with the key lost ; and nobody seems able to pick it. Therefore, the Rinderpest must remain a mystery, and the Blue Book which records it

simply an oracle ; which will answer no question or give any sign.

Now, I believe that the Rinderpest is as capable of being cured as the measles ; if the oracle is only questioned in the true spirit of physiology. We have all we want to enable us to solve what is now a mystery ; but it must be done by the greatest sacrifice, and that is nothing more nor less, than to throw overboard all our prejudices, all our dogmas, all our false physiological theories ! Can this be done ? We have the disease now amongst our herds, and foreign herds breed it still. Is it to remain in England as its habitat ? Is the pole-axe still to be the only safe *modus medendi* ? Are we still to lose our cattle and their money value ; and is every householder to be mulct in twopence a pound for all his meat, because science is so helpless, in this second half of the nineteenth century ? These are serious questions for the community to have put to them ; and more serious, as well as disgraceful to science, to be told it is powerless. All the beautifully coloured pathological drawings of the Parliamentary Report leave nothing to be desired. The description of the disease is perfect. What does it lack, then ? Only two things—its true physiology and treatment. At present there is nothing but what is either false in the one, and most pernicious in the other ; yet they are capable of being resolved into the most marvellous simplicity.

The PHYSIOLOGY fully demonstrates the want of the inorganic elements in the system ; and the TREATMENT the best means of supplying these ; and to assist Nature to do so as well.

The letters concluding this work, ended with the year

1865. In February 1866, I received a letter from a surgeon in Shropshire to the following effect:—

‘DEAR SIR,

‘February 25, 1866.

‘I much regret that you have discontinued your most interesting and most valuable letters on Physiology. From the views which you have maintained on certain points, it struck me, as soon as I saw the great outbreak of the Cattle Plague, that you might break through the mystery which surrounds it. All have tried their skill, without any good results. Acting upon your general physiology, designed only for human ailments, I assisted a neighbour of mine six weeks ago in the treatment of his cattle, which consisted in giving the SULPHATES. The result has been most successful. My mode was to give, *dilute sulphuric acid, two ounces; sulphate of iron, three quarters of an ounce; sulphate of zinc, half a drachm.*’ (He does not mention in what proportion of water, or how often the dose was given.) ‘When excessive purging came on, *sulphate of copper twelve grains*, in a quart of warm water twice a day. Barley, linseed, oatmeal, or rice gruel, to be the chief article of diet. I have saved *one in five*; whereas others’ treatment here have scarcely exceeded *one in ten or even more*. I wish to ask you whether you can suggest any better treatment, that, according to your views, would be more beneficial, as I have the disease a few yards from my house, and have also two cows of my own at present free from the disease. I may here remark, that from six post-mortems I have seen, the contents of the first and third stomachs (rumen and omasum) were *as dry as dust*. I may add, that brandy, whiskey, laudanum, chalk, &c., in

ANY quantities, in my experience, are *injuriously*, and that simple cold water is best.'

At the beginning of August 1867, a friend of mine, who has often derived personal benefit from my principles in the practice of medicine, as well as his horses and stock, was in Bedfordshire. While there, he accidentally fell in with a dairy farmer near Linton. Speaking to him of his large stock and the Rinderpest; the farmer said he had no fear of the cattle plague, for when it was most severe he bought cows at his own price, and everybody thought he would be ruined; but he had heard of a good thing for them, and he never allowed them anything but *acidulated drinks*. At first they did not seem to like them; but afterwards preferred them; and the quantity of sulphuric acid he used was enormous; for it was cheap enough. Directly he saw them lop their ears and their gums were red, and they refused their food, he gave them drenches of it; also opium and chlorodyne, and so stopped all scouring or purging immediately; and in a few days they were all right, and he never lost an animal. My friend asked him how he found all this out. 'Oh!' he said, 'he heard of it from somebody, and wondered why others did not do the same.' Here, then, is a proof of the singular benefit of the physiological treatment I have laid down; but whether this farmer got his knowledge directly or indirectly from my letters on physiology, or from other sources, I cannot say. I hope the latter; because others may be engaged on these principles of treatment as well as myself.

I may here add that I wrote a very long letter to my Shropshire correspondent, and several letters afterwards; but I never again heard from him, and can

therefore, give no further account of his proceedings.

To return to his post-mortem cases. There is no way of accounting for the contents of the first and third stomachs becoming *as dry as dust*, except from the absence of *naturally formed moisture*; and I must here say, that no amount of extraneous fluid would or could have moistened them, for any time sufficient for natural uses. The absence of power in the animals themselves, to make their own inorganic fluid elements, by the natural generation of hydrogen from their own secretions and fæces, in order to combine with the oxygen of the air, taken in such large quantities with their food and drink; was one most exciting cause of this dry state of their aliment after certain processes of digestion. The second; that no gases can exhale without the presence of moisture; and as the natural resisting gases could not be formed in their bodies, the oxygen, as a sequitur, finding no elements of combination, dried up the contents of their stomachs. Attrition and friction, producing their due amount of inflammatory actions, was the consequence. We have only to see this fully and graphically described in the Government Report. What, then, does this great bugbear, the Rinderpest, amount to? Simply this: that the self-supporting action of the system is out of gear; that the natural resistance of the oxygen is taken away, or rather hydrogen in sufficient quantity is not generated: therefore, the animal, being unable to make the proper amount of inorganic fluids necessary to life; a general and universal destruction of all tissues and parts ensues.

If an adult human being makes these inorganic lubricating fluids to the extent of thirty pints in every

twenty-four hours, entirely independent of the blood and any fluid he may drink, and uses them—how much more must animals make? Perhaps little short of one hundred! I refer to the fat obtained entirely in this way by inspissation of these fluids; and when it is deposited in its proper places, becomes not only the natural oil of their bodies, but the storehouse of aqueous matter to be used—not by combustion, as our present physiology teaches us, but by simple dissolution and absorption. In the face of all the symptoms in this disease, so characteristic of rapid destruction, owing almost entirely to the loss of inorganic elements: I shall quote from the Government Third Report, which I shall now entirely refer to—what were the principal remedies administered for the disease?

Vaccination; inoculation from the humours of the diseased animals; bleeding; injection of antiseptics into the veins; injection by rectum of carbolic and cresylic acids; sulphate and bisulphate of soda; inhaling the vapour of warm water and vinegar. The animals had given them by the mouth, brandy and opium in full doses; strong ale; hyposulphate, sulphate, and disulphate of soda; common salt; water impregnated with iron; Worms' mixture of onions, garlic, ginger-powder, and assafœtida, to which cayenne pepper was often added; oil of turpentine; carbonate of ammonia; solution of acetate of ammonia and chloric ether; half-pound doses of charcoal; bichloride and chlorate of potash; bark tinctures, and all kinds of diaphoretics; linseed oil in constipation; sulphate of magnesia, sulphur, and all their aperients, such as saline laxatives, with diffusible stimulants. Certain hygienic means and diet followed all these different

treatments. Only now and then do I find, by the merest accident, and that evidently only for the sake of experiment, that the *mineral acids* were given. Again, although it was constantly observed, that diarrhœa, evidently from muco-membranous inflammation and irritation, always lowered the animals; yet laxatives and aperients were nevertheless given. I need scarcely add, what the Report is fully justified in saying; that not only no good arose from any form of allopathic treatment, ‘that little benefit was derived from the use of drugs,’ p. 209; but, rather, the greatest evil from them; every symptom being aggravated—and it could not well be otherwise.

To show that all treatment was founded only on supposition and conjecture;—a trial was set on foot between the three great sects—the ‘ALLOPATHS,’ the ‘HOMŒOPATHS,’ and ‘NATURE.’ One hundred beasts were allotted to each. As a matter of course; the natural sequence ensued between the two first, as to what was, or what was not, Rinderpest. The animal quarrelled over was then set aside for Nature to determine; and so something was done to put an end to ‘such unseemly disputes,’ p. 234. The Homœopaths’ treatment consisted of aconite; ammonium causticum, and arsenicum; belladonna, and phosphorus; uux vomica; phosphorus, and sulphur: arsenicum, and rhns; pulsatilla; arsenite of iron; mercurius corrosivus. These medicines were sometimes given separately, and sometimes combined one with the other; according to the fancy of the giver. Porter entered into all their dietary. The treatment by this sect was not more satisfactory than the other.

Now for the Dutch system of treatment. They

have always placed the greatest reliance on the MINERAL TONICS, and '*have found them more beneficial than anything,*' p. 231. Muriatic acid in linseed tea; sulphuric acid, with quinine, gentian, ginger, ginger and tormentilla, and other astringents and tonics, as natural remedies. Washing the eyes, mouth, nostrils, vagina, rectum, &c., with solution of carbolic (phenic) acid, as well as giving it internally as a prophylactic remedy. Preparations of chlorine, for fumigating purposes, were found injurious, and often affecting the lungs. Distillers' wash and stimulants were found *unsuccessful, and often hurtful*. By this Dutch method we are informed, success at the rate of forty-five per cent. ensued. But nothing more than Empiricism was manifested in this treatment. They found it the '*most beneficial,*' and that is all they have to say on the subject. Neither philosophy nor physiology of the disease, nor cause or effect, ever transpire. No reasons are given beyond the old old ones of being found beneficial. I will now state what is done in Eastern Europe.

ODESSA.—Vapour baths, nitre, linseed gruel, and gentian; injections of tobacco water; bleeding; warm milk, mixed with garlic as drenches, which always failed; while repeated *doses of vinegar* and cold water were of great service, when every other remedy had failed (p. 238). '*Hush-ha*' (or poppy-heads) and '*Huibia*' (or chicory) stopped flux and allayed pain. In other cases, setons and mustard plaisters are applied to the chest; the seton steeped every day in fresh turpentine. '*Burn all swellings with red-hot iron immediately they appear.*' Four or five pounds of blood to be taken from sanguine animals. A pint of infusion of linseed and olive oil, as a drench, three

times a day. When the disease augments, add enough *sulphuric acid* to extract of *nux vomica* to the drinking water, to give a bitter taste. Half a drachm of spirits of ammonia in half a pint of water, three times a day as a drench. 'Three ounces of glue dissolved in a pint of tepid water will stop diarrhœa.' This latter treatment in Southern Russia and Bessarabia has been found perfectly efficacious, and caused the disease to disappear (p. 240). At JASSY they depend on acetate of ammonia, alternately with gentian, quinine, and peppermint, every two hours during the day. Black hellebore steeped in wine given to the animal, which is made to take active exercise immediately afterwards, in order to cause sweating.

At RAGUSA;—sulphur, mercury, and antimony are given, and hypophosphate of soda. In all this treatment nothing but usage appears to guide the administration of medicine; like every other medical treatment, human or animal, throughout the world. Supposition and conjecture on the best authorities, founded on hope, but neither physiology nor philosophy entering into the question. Now, without these the hope expressed in the Report has small chance of fulfilment: 'that the labours and views of so many minds brought to bear upon the subject will go far beyond the cattle plague itself, and point to the benefit of the human race, for the prevention and cure of zymotic diseases.' This is just the point where fresh thought ought to come in; but it never will, while speculation is the sole act, even of the greatest experience. Disease, as a simple effect, is a myth; and instead of being treated specifically—as it has been, on what is called the best authority; which is nothing more than the opinion of

certain men who in every age lead the whole community—the causes which produce it must be better understood. So that, when once philosophy and physiology go hand in hand, ‘such unseemly disputes,’ so constant amongst ourselves; as well as our theories and medical speculations on all medical subjects; would disappear, and would only be resolved into a question of the best way of carrying on sound principles.

Let us find a germ in the Rinderpest, which is only an aggravated form of the sudden and rapid loss of inorganic elements; leaving the organic as they were, and as they exist, when the inorganic are in their full integrity. Any impartial reader will see, if he has followed me from the commencement, that as the correction by all the alkaline remedies are the best, when the inorganic elements are in excess and the body in a superfluous, or over-exuberant, or acid state; that when given they cause the highest state of combustion, and either lessen or destroy them. That caloric is produced, and rapid conversion of the products formed from such treatment, are again acted upon by other elements; and these again, on freshly developed secretions, until the whole system is relieved;—relieved, because the organic elements are not interfered with or lessened; but are ready in the body to come to the rescue, and keep up the strength of all its general structures. It will be found true, that we can be almost heroic in our remedial and prophylactic treatment of the inorganic elements, which constitute ninety-five per cent. of the whole mass; but that we must be cautious in what way we attack organic elements. We must not tamper with these; for they are only five per cent., and we cannot replace them as we can their

opposites. The lamp of life may be represented by the oil and the wick : the former by the inorganic, the latter by the organic elements ; so that there may be plenty of oil and no wick, or plenty of wick but no oil : in either case the lamp goes out.

Now the Rinderpest, and all inflammatory fevers, choleras, and most of the zymotic diseases ; represent the lamp with plenty of wick and no oil. What will everyone find, when the alkalies are given in any form in all these inflammatory diseases ? That things are made worse : for the few remaining inorganic elements, which are the acid ones, are removed by them. What when purgatives and cathartics are given ? That the hydrogens—the great resisters of the oxygen of the atmosphere—are carried away ; leaving this latter gas to work destruction ; because it has no opposing element, and the system is unable to form its own lubricating fluid. What when bleeding is resorted to ? That organic elements are being robbed from the system ; so that if a beneficial change actually took place, naturally or artificially, the bases of reconstruction are cut away. What when counter-irritants are applied ? Only putting animal life to greater misery : because eruptions are Nature's legitimate counter-irritants in super-vital states ; and seldom or never come, certainly never in any form to diminish natural powers, in inflammatory actions ; therefore, as Nature does not point to their use, they should not be applied artificially. What when the mercurials are used ? Why nothing but a transfer of some inflammation from one part to another, causing only a temporary relief of the one, for which it has been given. What when alcoholic stimulants, such as brandy, tinctures,

and turpentine are given? That they increase irritation on all present inflammatory surfaces; and excite other parts, which may yet be free from them, to take on these states. What when spices, peppers, and all similar heating condiments, are administered? That they cause greater irritation, and aggravate all the symptoms. What when onions, garlic, and all these analogous bulbs, are used? That they relax the mucous surfaces, and often promote diarrhœa, as well as cause thirst, and absorb inorganic fluids. What when diaphoretics and diuretics are given? That they carry away the watery elements of the fat stores, wherever these are deposited, when the object should be to retain them. What when vaccination is performed? That doing this, on the supposition, that something exists which does not; that the disease is from some specific blood poison, when it is not, and cannot be. What when inoculation is performed? That the diseased elements, both inorganic and organic, will produce in the bodies of sound animals, a similar inflammatory state, is most culpable. Because if any animal, so having the disease induced, cannot be cured with any certainty—as has been proved by the treatment of those who had it naturally—is only placing that animal in danger of its life; without the slightest benefit likely to accrue. The administration of charcoal cannot be of any service; because the animals are already robbed of all elements which poison the system, which are the inorganic in excess; and therefore there is nothing to be counteracted by this remedy. So much for the Allopathic remedies of the Faculty and Veterinary fraternity in Rinderpest!

The Homœopathic remedies being more or less

visionary in their actions, and if administered homœopathically could not possibly do either good or harm; yet if given dishonestly by them, that is, in similar doses which the allopaths would use, some of them would be most injurious; while those that were beneficial, carried no logical deductions with their administration. It would be certain that ammonium causticum, and arsenicum, and mercurius corrosivus; would go more quickly to destroy life, by aggravating the disease; and so to save the use of the pole-axe, the knife, or the bullet. Taking all these things into consideration; it will be clearly seen, that all the foregoing remedies and measures went far to aggravate the disease. On the other hand, if we see what is actually wanted, which is nothing more nor less than the restoration of a balance of power of the inorganic elements; and that this object is only to be attained by the opiates in their crude or aqueous, not in their alcoholic, form; to arrest all secretions, and the administration of the acids, which in their conversion into gaseous elements help to make such resisting ones, which the system always requires, to oppose the action of the oxygen. The Dutch, and some others, as I have shown, have fully established the empiricism of this treatment: but science requires more than this: it wants to know upon what principles it does good, both physiologically and philosophically.

I have proved for years, that in all fevers and inflammatory conditions of the mucous and serous membranes, that opiates given for the express purpose of locking up the bowels, which is done by detaining the natural secretions; and that the acids generate such gases as mix with and oppose the oxygen, and furnish

most rapidly the self-generated fluids, whose duties are to assist the organic elements to repair and reconstruct destroyed tissues. Having watched this in the human family for many years; I cannot deny myself the pleasure I felt in reading the following in 'The Report of the Rinderpest,' p. 93, and which I can fully verify:—'*Rapidity of Repair in Diseased Tissues.*—It is very curious, considering the tendency there is to the formation of sloughs, how rapidly parts heal; even during the progress of the disease towards a fatal issue. In the abomasum, shallow depressions have been seen in the mucous membrane, which are manifestly the cicatrised or cicatrising excavations whence sloughs have recently separated. Again, we find the edges of perforations of the folds of the omasum cicatrised or healed, whilst sloughing is still in progress in other parts of the folds. It is remarkable, too, how rapidly, on the supervention of convalescence, the mouth and other organs regain their original healthy condition.'

All this is perfectly correct, and which I can verify in thousands of instances, and which is constantly occurring in the colon of the human being; but as this organ has been so completely ignored by the profession, except to purge it constantly of its natural manure, or only to examine the fæces coming from it, and men think by doing so more assiduously than others, that they ought to know its physiology; while, nevertheless, all its true and noble duties are yet to be discovered. The liver and many other organic centres have had too much notice and importance bestowed upon them; while many others equally important, such as the colon and its uses, have been entirely overlooked. I there-

fore conclude this section on the Rinderpest; which has only been incidental to greater conclusions; but is analogous to many affections to which the human frame is subject; and which have been treated in precisely the same way, and will be to the end of time, unless a physiology that will serve us, steps in to supersede one that does not. The conclusion, then, is obvious, that opiates, and mineral acids, and tonics in such doses—mild at first when the disease first shows itself, and bold when it advances, in either man or animals—are the only true prophylactic remedies: as they restore the balance of power and the principles of life. And I here repeat; that as there are very many diseases, such as fevers, &c., showing similar symptoms; it will not do to treat them all in the same way; simply because their causes may be distinctively different. One set; where the inorganic elements are in excess, requiring the alkalies.—and another, where they are deficient, requiring the acids and opiates. They are easily distinguished, and, when once known, their treatment becomes exceedingly simple, as well as efficacious and scientific.

VIII. Having spoken of the colon as the great gasometer of the body and a viscus so little understood, I would seriously ask—Is it not too hardly used? Are not cathartics given to a greater extent than is at all justifiable, even in our present knowledge? If the anatomy of this viscus has at any time opened our eyes to some great truth respecting it; has not physiology thrown dust into them immediately and blinded us? If I have shown the uses of the fæces as fæces; how long are we to be so culpable in carrying them away? What are the conditions of the system which

warrant the actual use of cathartics; and what the actual conservation of what these carry away? I do not know more important or more vital inquiries.

Having given my physiology for the uses of the *faeces* as *faeces*; and the important part the gases play in sustaining the electro-vital condition of the whole system, through the inorganic fluids derived from these sources; and seeing these are the first affected in all sudden emergencies, I will first speak of accidents. It is a well-known fact that, when anyone is struck with a bullet in any part of the body, deep or superficial, that thirst is the first thing complained of. Recollect we are now dealing with two elements, the inorganic and the organic; the former being 95 and the latter 5 per cent. in the system, on broad calculations. The first effect, then, is seen in the inorganic elements becoming rapidly used or absorbed. The sufferer wants water, brandy, &c.; anything, in short, of a liquid character, as a temporary substitute for that which his own system has so suddenly lost. If the injury is slight, it is soon got over; but if severe, and much structure destroyed or blood lost; reconstructive elements are called forth to an extent little dreamt of at present. Nature will then husband as much of the organic as she possibly can for this purpose; but she cannot so well supply the inorganic. The first thing she does, is to conserve the bowels, or rather the *faeces*; to get all the hydrogen she can, as some febrile action is sure to set up in the system. What is the first question of the Faculty? Are his bowels opened? No. Then give a cathartic! By which the patient is made worse. It has often been remarked in a marching fighting army, where there has been no time to

stop, and the wounded must follow somehow; that attending simply to the wounds and leaving the rest to Nature, because time cannot be spared for proper prophylactic remedies, that they always do best. If the inquiry had been made; it would have been found that numbers of these cases, left alone to Nature, had the due conservatism of their bowels; consequently, all and every chance of furnishing inorganic fluid elements to assist the organic in reconstruction. But woe to them if the doctors gave them cathartics; cure retarded, or death, being the result. Cathartics, then, are not wanted here. The same thing applies to any severe fall from heights, sudden shocks, blows, bruises, contusions; anything, in fact, which has shaken the individual through any or throughout all his great centres. Some parts are more immediately affected than others; some reconstruction by Nature of solid or fluid elements has to be done. Conservatism, if looked for, will be found. Ask the question, Why? and my physiology will answer it. Cathartics are here also most injurious. Therefore, accidents of every kind had better be left alone; if cathartics are to play any part of the treatment. If treatment is called for, it should be directed conservatively; and, if inflammatory actions set up, the mineral tonics administered. Acids and opiates and acidulated drinks are required, because arrest of fluid actions and the disposition that the acids have to cause evolution of their gases, supply the system with what it cannot supply itself with in sufficient quantity. Next, then, as to natural constipations. These I have shown to be individual idiosyncrasies: from one day to two or three weeks. If relief is to be given for any ordinary discomfort arising in these individuals; it is

through the mineral tonics; in order to supply from another source; what Nature is trying to get from her own; but not by the use of cathartics. These always make things worse; as thousands can testify. Next, as regards the simple impaction of the fæces in the rectum—a very common occurrence. Cathartics, often administered, are here likewise injurious; for they often produce the very thing they are given to cure. And not only this; but their unwise use carries the chyle quicker through the jejunum or small intestines, causing loss to the system of fresh organic elements, and often produce disease, by destroying the physiology of the intestine by dilatation, when its sides should always be in apposition, in order to perform its proper functions. An enema may be useful here, but only sufficient to moisten the hardened scybalæ immediately in the rectum. Cases are recorded by intelligent men of simply breaking these down and bringing them away. I will refer my reader to a case of this kind, recorded in the 'Medical Press and Circular,' July 4, 1866, p. 2. I have often, in certain low conditions, brought this conservatism on intentionally, and let the fæces remain in the rectum until I knew my patient was out of danger; and then broke them down with my finger and brought them away—sometimes a pound or two by weight; sometimes more. The Faculty, as well as the public, have an unnecessary dread of impaction, costiveness, and all these states of the colon and rectum. If we look through the recorded cases of this kind in our journals, and the means used to open these obstinate parts; we are sometimes indulged with the summary or aggregate amount of cathartics used; with the amount of gallons

of injections, and then get the naïve remark, ‘How astonishing it was, the patient seemed none the worse for his stoppages!’ though half-killed from the effects of the remedies. If Nature is assisted by the mineral tonics, to get her hydrogens from another source besides the fæces; she will let these go of her own accord. Stoppages of the bowels, as they are called, are bug-bears; they are simply the conversion of the fluids from the fæces into gases for natural purposes; and, being deprived of these, the solids condense. This state is always made worse by aperients. Sometimes, when they do not occur in the rectum; the fæces are somewhat obstinate in being dislodged from other parts of the colon; but impactions in the rectum alone, need never alarm the patient or the doctor, as long as he has a strong forefinger, or can properly direct another to use his or hers. In fevers, cholera, inflammatory gout, rheumatism, or dysentery, inflammatory actions of internal mucous membranes, or, in fact, in any stage where Nature has herself resorted to conservancy, cathartics are most injurious; and this has been fully shown in the Rinderpest.

Now it is well known that constipation will produce headaches; but it is not equally well known that loose bowels and diarrhœa will do the same, and, what is worse; softening of the brain, and far greater evils than constipation. There are no more important points to be considered in medication, than the pernicious use of cathartics in all head affections. If I were to name the four greatest exciting causes of monomania and madness; I should say the mercurials, cathartics, excessive drinking, and a morbid sense of religion: had more votaries than from any other sources. I

have already in my physiology spoken of the great sympathy between some of the abdominal organs and the head, but more especially of the colon, with the reflective portion of the brain or cerebrum. Those whose idiosyncrasy tend to a conservancy of the colon, should be most careful in the use of cathartics. I have watched individuals for years, and have known what would be the result of their pernicious habits of taking aperients: but no advice, no caution, will ever turn any man from his belief, or the world in general from its fixed prejudices; for man is always found to be—

‘Most ignorant of what he's most assured.’

I will give two opposite cases, the types of many similar ones:—A man engaged in business; tall, thin, dark, and cadaverous, whose youthful idiosyncrasy was conservative. Arriving at man's estate, he became addicted to aperients, in order to get what he called his daily motion. At the age of thirty-nine years, in good business and circumstances, married, and the father of a family, he is seen to show a tendency to some hallucination, and in a few weeks becomes an inmate of a lunatic asylum. When constipated, the physician is told of it, says his liver is out of order; and cathartics are prescribed. Whenever these are given, the patient becomes in a raving state for a few days, but afterwards gets more tranquil as the conservancy of the bowels again occurs. But who amongst the whole Faculty will allow any patients' bowels to be confined? Our present morbid physiology will not justify it. So this poor man will, perhaps, be, for the rest of his life, an inmate of a lunatic asylum, because

the doctors will not let his bowels alone, or give his peculiar idiosyncrasy a chance. Indeed, the reverse; for his physician cannot imagine there is a chance of his getting better, if this channel is not kept well open; when probably, by letting Nature alone, and allowing her to get her brain power and her reconstructing elements from their own natural sources, he would recover. The opposite to this is a case where a gentleman, from youthful indiscretions, had taken large amounts of mercurials, and for many years afterwards suffered from intense irritation and looseness of the bowels. He could never depend on any settled condition of them, and when I first knew him, he was bordering on ulceration of the colon; but for the last five years this and the relaxed states have been kept under control by the mineral tonics and opiates. He never went anywhere without them;—he dared not, in fact. Still the years he suffered before I knew him had told upon him; and at forty-five years of age, a change in his circumstances occurring, he became mentally excited;—in fact, in that state which the profession designates as ‘softening of the brain.’ Extraordinary excitement set in; he suddenly saw some fact of importance arising out of every trivial incident; then he was about to make a large fortune by some cunning devices that the trade, in which he had been engaged all his life, had not seen; in short, he was to become a millionaire. From this stage he purposed buying estates, and to keep his establishment of horses, carriages, servants, &c., on the grandest scale. Then he was going to build a tabernacle for all the kings of the earth, and to bring about the Millennium. From this overwrought condition of the brain, he has now all

the characteristics of delirium tremens, and at times is barely instinctive. Take all these matters from beginning to end; I say the Faculty are not aware of the injury done by cathartics, on the one hand; and natural relaxed conditions, on the other. Witness the number of children born with a disposition to relaxed colons; and, as they grow up, they get irritable brains; shown by their unstable tempers, their captiousness, their general uneasy temperaments, sometimes satisfied, but more often hard to please; yet, with all this, precocious, and quick of apprehension, learning, &c.: but they never rise to be men of steady intelligence; they become erratic human beings. Here, again, is the error of giving children cathartics on every occasion in their small ailments, and so producing weak intellects.

If the volumes of our medical periodicals are searched hereafter for real benefit to mankind, it will be to see the shoals to be avoided—not, as the writers vainly hoped, to offer landmarks or beacons to be followed. I will instance some most remarkable cases of the fallacy of giving cathartics for ‘softening of the brain.’ A hospital physician furnishes them, he says, ‘almost entirely from our own hospital records’ (‘Medical Times and Gazette,’ December 1864). In the ‘Medical Press and Circular,’ September 1866, we find him recording the following cases:—

‘Case 62.—Fæces passed involuntarily. Died comatose.’

‘Case 64.—Passed alvine evacuations unconsciously; *in spite* of cold lotions to the head, *aperients*, &c. She died in a comatose state three days after admission.’

‘Case 66.—Cupped to sixteen ounces. *Purgative injections* were given. Hiccough came on. Passed all her evacuations unconsciously. Cupped on the temple. Hydr. c. creta, bis quotidie. Drowsy. Tried to speak. Comatose. Death.’

‘Case 68.—Had *mercury* freely given. Restless. Delirious. Death.’

‘Case 69.—Vertigo and weakness of the limbs; and, in spite of the treatment, he became worse. Delirium. Death.’

‘Case 71.—Bowels not having been opened for some time, *an injection was given*. In the evening he became delirious, moaning, and screaming. Death.’

‘Case 72.—The bowels were opened by *aperient medicine*. She became delirious at night, and the headache worse. Death.’

‘Case 75.—Ice to the head. *Aperients* given without effect. Croton oil gtt. j.; e. cal. gr. ij. Bowels well opened. Delirium. Death.’

‘Case 77.—*Aperients* and diuretics were given. Delirium and strangeness of manner came on. Delirium. Coma. Death.’

These cases are so marked, and all bearing the same character, from simple lassitude, vertigo, and other small cerebral ailments, and all treated by *cathartics*; and these are set up as beacons to light science on its path. They show that the sympathy between the colon and the brain is not known. The reports also show that the sheet anchor in all these cases was in the use of cathartics; for it constantly occurs that, in spite of them, and the bowels being well acted upon, the patients died. Not once does it seem ever to occur to all those physicians and surgeons of a great hospital

who treated them, and which is able to supply so many cases, that there must be something wrong in their physiology and their treatment. Again, look at those melancholy cases of the worst vice in many of our youths. Constipation is always the accompanying feature; and, if this is allowed, many get over their debasing propensities; but, if cathartics are given, constant involuntary actions ensue, and if the colon becomes relaxed; this, and the vice combined, over a given time make them idiots—the reflecting portions of their brains ceasing their God-like functions entirely. The administration of cathartics in delirium tremens is also most culpable.

Let us take jaundice. The Faculty know well enough that constipation is one of the symptoms. They give cathartics, and then wonder why the disease is so obstinate. I had one of the worst cases of jaundice in a young man; and the boast of one of our first physicians was, that it was the only case that he ever had where he was enabled to keep the bowels opened daily over many weeks. What was the result? That obstinate jaundice was not in the least relieved. I had more to contend with from the drugs which had been given, than the disease itself. Whenever I could keep the bowels confined for ten days or a fortnight, the patient got better. All the depressing feelings which accompany this disease yielded to a more hopeful state; but directly the bowels acted of their own accord and of actual necessity, back came the jaundice in force. Cathartics in jaundice are most injurious. Let any one try the conservative plan with opiates and the simple mineral tonics, and jaundice will soon yield. To new-born babies and their mothers it is a most

reprehensible practice to give cathartics or aperients of any kind. To the latter especially, as the bowels are always well relieved naturally at these times; and it is some days before the colon fills again; especially when the worst plan is followed of keeping the parturient woman on low diet, when she should have a chop or good solid food the following day. But gruel diet, and on the third day castor oil, have sent many to eternity, besides keeping thousands low and weak for months. Want of space does not allow me to state the many evils of cathartics, or to specify their injurious effects on the system in cases where our schools believe them to be sheet anchors. Some day they will be found, as I have found them, to be the cause of many small ailments being increased, until absolute organic lesions supervene; and also how wonderfully few cathartics are really needed. It is the belief of the whole profession that many heart diseases are brought on through want of integrity of the liver, as I have heretofore mentioned. This I believe to be mythical. They are oftener brought on by cathartics, which have emptied the colon as well as disturbed the physiological law of the small intestines. I know many men who are not satisfied unless their patients can show them a peck of fæces at every visit; and then wonder why they die. It would be a greater wonder if they did not. In consequence of this dreadful practice; flatus to a great extent distends the alimentary tubes throughout their whole length, and dropsies are the sequence. In consequence of the deficient supply of chyle, the blood gets impoverished, and the heart labours enormously, and is set down immediately as being the diseased organ, as well as the cause of the dropsy and

all other ailments; while it is not really diseased, but is only a sufferer from the effects I have described. I have seen too many of these cases, and have convinced those who have attended the post-mortem examinations, that the heart was not affected, and as they could too plainly see then. Whatever enlargement there might be, the most hardened pathologist has been obliged to admit the heart showed no lesion. Men who get to their half century of existence, and think they are getting too stout and their figures spoiled; will endeavour to reduce this state by diet, cathartics, and other measures; and boast of having done so to the extent of one or two stone weight. They then get precisely what I have above described—dropsy and quasi-heart disease; and then die. I have seen many melancholy losses of most valuable lives in this way. Alas! they little know that the natural fat stores at that age, are designed for the support of their peculiar idiosyncrasies. I am myself ten years past that age, and delight in having these stores, and should not care if they doubled Falstaff's himself. Little do men know, when they war against natural idiosyncrasies, in order to prolong life, that they shorten it, with every attendant evil and suffering. Depend upon it, heart diseases, as they are called, as well as brain softening, are produced more from cathartics than anything else. But when present, cathartics are pernicious; so they are in dropsies, gall stones, lung and brain diseases, overwrought mind and great anxieties, renal diseases, such as diabetes, &c., and many others, where they are given now on the best authorities of the schools. Our hospital treatment is most pernicious in many ways; from the belief in diurnal actions upon the bowels, or that it is absolutely

necessary that the bowels must be kept open. How often do we hear the visiting physicians and surgeons saying to the sister of the ward, 'If that man's bowels are not opened by the afternoon, give him a dose of the house medicine at night.' This house medicine is the peculiar common cathartic mixture used in every hospital. Where I graduated, it consisted of the *mistura magnesiæ cum magnesiæ sulphatis*, or common salts and magnesia. Thirty-five years ago there were two physicians there: one gave nothing but calomel for everything; the other, nothing but 'M. M. cum M. S.,' as it was termed abbreviatively. At last old 'M. M. cum M. S.' had not a single disciple or pupil at his heels; but if you went into the wards after him, and asked the question, 'Well, sister, nothing but "M. M. cum M. S."?' 'No, sir; some at night and some oftener.' I ended my own clinical clerkship under the old calomel doctor thus:—We had come to the last bed. 'How many beds are there in this ward?' 'Thirty-two, sir.' 'Well, all the others are under salivation but this man; give him four grains of blue pill night and morning, and then he can't laugh at the rest.' Now I am greatly indebted to these two mistaken individuals. Their practice roused thought, and I have found that what I learnt most at the hospitals was to avoid in after life what I was taught to do in them. No wonder we have a greater mortality in the class therein treated, than in a similar class at their own homes. In the hospitals they *must* take their physic, like sailors their lime-juice at the capstan; at home they don't. This is quite sufficient to account for the larger percentage of recoveries. Cathartics are admissable in sudden congestive, rheumatic, and

gouty affections; but not in inflammatory ones, nor when gout is an inheritance, or becomes too chronic. Sometimes this class of sudden rheumatism runs into spasmodic actions of the lower extremities; then mild cathartics are beneficial. Where they are of the greatest service is, in chorea saneti vitæ. I have seen much of this in children from four to thirteen years of age, and what a judicious use of cathartics will bring away from their loaded mucous membranes is wonderful. This is *per se* the highest condition of super-vital supplies, which the system can possibly live under; so much so, that the convulsive twitchings and all the curious grimaces and contortions of the body are due entirely to an over-electric state from these causes. In all such cases as these, there is an excited or increased electric action along the whole course of the nerves, and a corresponding increase of heat in all the inorganic fluids; causing them to traverse with greater rapidity and in excess, through every muscular fibre, fasciæ, &c., of the body. Mechanical excitement is a natural sequence; and which then overrides the control of the will, and hence the phenomena we see. This action is very different from the heat produced by fevers or inflammations when the inorganic elements are less in volume than they ought to be in the system. The great friction which then ensues from want of these, produces rapid oxydation of all structure. The organic elements being now in excess, no extraneously taken fluids seem capable of moderating or mixing with them. It is not until the natural inorganic elements become formed again in the system itself, by the union of its natural gases with the oxygen, that this friction becomes lessened and ultimately removed.

When all the parts are thus sufficiently moistened, the feverish or inflammatory heat is moderated.

In chorea, for weeks together, nothing like a healthy stool is at all apparent. Mucus, slime, black scybalæ, black fluids, and other impurities, lodged or retained in every nook and corner for perhaps many months, keep up the highest state of excitement; and, moreover, the gases generated from these sources find their way along with the hydrogens throughout the body. So that when the oxygen mixes with these, as it does everywhere, to form the inorganic lubricating elements in the fibres of muscles, or along the courses of nerves; these other gases excite every tissue in every part of the body, producing constant super-electric actions, and hence we have the phenomena of the choreas. The present practice of giving tonics may relieve the great galvanic currents at work throughout the system, but they do not remove the cause. When this is done by constant exfoliation and radiation of morbid deposits from the internal mucous membranes, and the alimentary canal begins to receive the débris from the deeper seated inorganic elements, by and through exhaustion of them in the due current of animal life; then the nervous and muscular twitchings gradually cease. If this is done with caution and by time, the system gets perfectly clear of the disease; but while doing so, it must be well kept up by the best and most nutritious raw material in sufficient quantities; because, while taking away such an immense amount of morbid material, reconstructive ones must be supplied. Starving or low diet is most hurtful.

During teething in infancy, aperients are not to be neglected. Children should teeth under one or more

of the three following conditions: namely, dribbling from the mouth, puking their food, or be more or less relaxed in their bowels. Dribbling is a natural low state of insalivation. When we consider that a large quantity of bony matter is being formed almost suddenly, and much of this condensed into enamel; we can readily imagine the quantity of organic and constructive matter necessary for the purpose, which is five per cent.; but, on the other hand, that the inorganic is needed at the rate of ninety-five per cent. This latter it is which gets in excess, and in the conditions I have mentioned these are cleared from the system, while the mucous membranes are always kept moist. The alveolar processes are formed without trouble; the teeth grow within them; arterial and all other blood vessels, together with their accompanying nerves, are all well formed and supplied, and do their duty healthily, and no trouble occurs. In fact, the teeth are cut, as it were, by magic. If these conditions are absent, the mouth gets dry, hot, and feverish; the child is constantly requiring the breast or diluents of some kind; it is uneasy and fractious; its teeth are cut most irregularly, and require plenty of lancing, and it is subject to fits and convulsions. All this is entirely owing to want of the inorganic fluids. Ipecacuanha wine and slight mineral tonics are here needed, and if the proper percentage of the inorganic elements are induced, the best results ensue; for there is always an abundance of the organic elements, but they are not sufficiently diluted with the inorganic. Encourage vomiting after food and a relaxed state of bowels by mild aperients and plenty of fluid food. By this plan hydrogens will be more readily evolved throughout the

system, which, with good free oxygen, will make the inorganic fluids, now needed. The homœopaths have, by some occult reasoning, countermanded cathartics and aperients, like many no doubt belonging to our own body, from having seen the baneful effects of them; but inasmuch as they have given us no physiology for their dogmas, they can take no other credit but what a certain amount of experience or empiricism awards them, however correct their dogmas may be. There are, no doubt, many instances where cathartics are very beneficial; but I deny their uses and their frequency as now given, and utterly abhor the pernicious doctrines of 'keep the bowels open,' 'relieve the portal system of the liver,' and a host of similar errors, which have ever been the means of complicating disease, and making what was bad, much worse.

There can be no doubt of one thing; that cathartics, when largely combined with the mercurials, destroy the bodily and mental powers more than any other form of drugging. When I see such morbid mental conditions of society of all classes, I cannot but ascribe much of it to this cause. I do so, because numberless cases have come under my own treatment within the last few years from the effects of them; their disuse has been followed by a healthier condition in both respects. If it is so in the sphere in which I practise; what must be the aggregate of the whole community? No one who knows the public and the present day practice of medicine can deny, that all persons consider themselves bilious; that they attribute all their diseases to the liver; that the whole Faculty endorse this, and administer some cathartics; that all the chemists and druggists throughout

England are provided with bilious and antibilious pills by the bushel; that the public go and buy them for almost every ailment; and the whole extent of their knowledge seems to be—to have something for the liver, and something to open the bowels. How can we expect anything but what we see?—morbid minds and unhealthy bodies! Nature alone is their good friend, who, with all her ill usage, still manfully combats this continual opposition and destruction to all her laws. If there be found the ‘*mens sana in corpore sano*’ amongst us; it is with those who eschew physic; simply because they do not want it, and are wise enough to let it alone when they do; but whose constitutions, no thanks to themselves, are so good that they let Nature alone to right herself. Those who are always flying to the doctor are those who are never well, and never will be;—not from any fault of the doctors themselves, but from some yet unrevealed knowledge of the principles of life to guide them.

The action of drugs is so completely concealed from us, it compels us to admit that it is only from a certain experience of their effects on the system, that we are able to form any judgment of their use. However this may be, we are often disappointed when they do not act as we wish. Under these circumstances, I may, I think, be allowed to offer an hypothesis on the subject. When our knowledge of the gases of the body becomes greater; we may find that these, having been altered in some inscrutable manner by the drugs, effect the end in view, and, when they do not, the drug is powerless. As the presence of oxygen gradually decreases in the alimentary tract; we find the first effect of this in the ileum; and as it is all but absent in the colon

when that again is in perfect integrity and full of its natural manure, the formation and evolution of the gases therein prevent oxygen finding its way there. I have frequently thought (mind, this is only an hypothesis) that the action of the cathartics upon the bowels was produced, by their carrying oxygen into the colon, and there uniting with the hydrogens, causes liquefaction of the fæces, which are forced out of the rectum by a species of combustion. Such may also be the fact in spontaneous diarrhœas; but when these acts are carried too far, so as to produce the choleraic stages, the phenomena we then witness, are simply the absence of fæces and consequent want of power in this great gasometer to generate the hydrogens and other gases so necessary to the system, as legitimate opponents to the oxygen. A stricter enquiry into all these laws will, perhaps, some day set aside the dogmas of blood poisons and other myths.

IX. The practice of medicine is surrounded with difficulties; from diseases, disorders, and functional derangements of an occult character, not actually affecting life; for life is the most powerful act of Nature, and will sustain itself for very many years, even under the most trying conditions.

Take, for instance, the strumous, the scrofulous, the cancerous and the direct gouty diatheses peculiar to some families. What do we know of these? Whenever anything distinctive is revealed in the state of their secretions, we can benefit them; but when these are hidden from us, as in the darkest caves of the ocean, what can we do? All have witnessed the strangest symptoms, produced with all their attendant sufferings, apparently irrelievable from causes as strange. Many

of these affections are probably inheritances;—seeds sown in a thousand ways, and left to germinate under certain conditions. They may be called pure blood poisons by the Faculty; but this I cannot admit; neither can I admit them to be purely poisons, floating continually in the inorganic elements; though there may be a very marked deterioration in both these fluids. Many of these are, however, by the chemico-vital laws of the body, resolved into gases; and so insidious are these that they are more likely to germinate elements of a poisonous character, and so affect the organic as well as the inorganic fluids in transit throughout the whole system. So that, without giving a distinctive poison to either of the three great motive agents of animal life; they may all share it between them. I have come to this conclusion from the fact, that we cannot in physiology dissociate any given element; because of the incessant alteration and fresh combinations which are continually taking place between them all, and one so depending on the other, that they cannot exist long in any one of them separately. And furthermore; that in a vast number of these occult cases; aromas so peculiarly and characteristically gaseous, more or less exhaled according to the diseases and affections and the idiosyncrasy of the individual, are unmistakably present. If these arise from the body, we can at least appreciate some influence upon them from those which are absorbed by it. Thus we see that the air of the seaside is empirically prescribed for the highly strumous and serofulous classes: we do not know why, but it is very hard if certain experiences have not availed for good, when no explanation, philosophical or physiological, can be given. Therefore,

whether it be a peenliar taint from inheritance or the effect of drugging which has produced these, it matters not. The poison of the syphilitic diseases, combined with the mercurial and other drug poisons, often take a long time to be purified from the system. The poisons also produced in the system by hard drinking, taint for generations the gases evolved within the body, as well as the organic and inorganic fluids. But, whatever these are, the facts are present and baffle us. Diseases produced by drugging are, however, sooner got over than those produced from fixed natural conditions; because the system will occasionally show some given laws to be combated with; while the others will not. I am, therefore, willing to confess my perfect inability to cope with that which has puzzled more experienced men; and these are the eases I would always restrain my pen from touching upon; because they are so delusive, and so completely beyond all law of diagnosis or treatment.

There is also the great army of Protean disorders, ranging under the head of hypochondriasis, hysteria, and spinal complaints; than which none are so puzzling to the young practitioner. Even the old ones have their trials in these eases. Great caution is necessary as we approach the bedside of these patients. For be it understood (*sotto voce*) that there must be disease of some kind, or whence all this suffering? All confidence would be immediately lost, if a doubt was thrown upon their reality. Indeed, it would be fatal. Well, what are these lingering maladies which never kill? Mental impressions of a morbid character take rank amongst them. Inertness and want of active

exercise, of both mind and body, lead on to laziness of an absolutely incurable character. People well to do in the world have delicate children, with over-considerate mothers, who, knowing nothing of physiology, or the great principles of life, and on the least occasion for alarm, are fearful lest a breath of air should blow on their delicate offspring; and they, therefore, first fan the flame. Then comes the close chamber, and the luxury of being waited upon, bringing far too great temptations to an idle disposition to be resisted, or at least not to be taken advantage of. The sofa and the bed next become the only resting-places in one room;—generally the best in the house, and ultimately made its very centre. A reclining position, as a matter of course, being enjoined: while every indulgence, in which every member of the family contributes, is brought here; and everyone is made, or voluntarily makes, some sacrifice for this truly pitiable object. Some fresh savañ, the last recommendation of some sympathising friend, pays a periodical visit. The old farce is gone through of spinal examination, medication, and hygiene; only to be carried out for a short time, and then abandoned as too fatiguing to the patient; or, not so satisfactory as was expected. Let the healthiest individual in the world, as free from spinal disease as many of these idle and indolent young creatures, complaining of pains in back and sides and limbs, be treated in the same way for a punishment; and the whole train of sufferings from like causes would soon be set up. No exercise for the physical powers being allowed, the most irregular calorific actions would occur; from the simple fact of the electric batteries being in perfect disuse and inactivity. The natural gases of the body

would become vitiated and unappropriated, from the denial and loss of the free oxygen, wherewith they should combine. Every feature of these cases would be set up, by the artificial mode of producing them. As I have shown so many uses for the gases generated in the body, and their combinations, and so varied are the inorganic elements to be made from them, and the deposition of fat formed from them by simple inspissation,—where all these active agencies are stopped, what means are there for the fibres of muscles to be lubricated, and if they are not by these natural streams, what is their capacity of use under such circumstances? After a time the least exercise, on some charming tempting morning, brings pains in every part of the body, and especially along the great nervous trunk. If all these can be brought on in the healthiest system by a sort of Tartar or Chinese punishment; how much more are they present in the wickedly slothful, who have produced them by the same means. I have seen many of these cases? A few only, of a real character, have ever excited my deepest commiseration, for their percentage is few; whilst the greater number of fictitious cases have roused my profoundest indignation. Examining these latter cases by my own physiology, I have found the digestive organs perfect; the appropriating organs active, and doing their proper duties; the colon in a high state of integrity; and, in fact, the whole system doing all its legitimate duties. In addition to this, many acts of healthful life are often performed to admiration, when the individual has been pleased to enter into them; but when not inclined to continue them, going back to the thousand and one ailments begot by fancy, and increased by indolence. There are

other cases in which, perhaps, Nature, without the individual cognisance of the matter at all, causes low, nervous power, and its consequent depression; from some outrage to her laws, which the rigid morality of society cannot allow to be transgressed; and thus we witness the evils of an enforced celibacy. The class of nervous diseases produced from all these combined facts, have attracted the attention of the wisest, but found 'enrable by no herbs.' It is, however, to the vast number of diseases which come under the grand denomination of spinal complaints, that I would caution all against having any faith in. Also in those, when the youth of both sexes are entering into the reproductive stage of their existence; and anxious friends, while looking at their pale faces, and watching for the advent of phthisis, treat them with too great care and luxury, and so coddle and physic them into the disease they are so anxious to avert.

Seeing that these occult disorders do exist largely in some natural states; what I aim at most is, that they shall not be produced artificially by injudicious medication. We can afford, then, to await the elucidation of the more occult or indistinctive diseases; if we can erect better principles to serve us in the treatment of those, which are more distinct and apparent, using these as bases in order to work up to them. The numberless drugs now used, of a doubtful character, for different and for the most part imaginary symptoms, must always be speculative. They come under the head of neutral remedies, having no distinct chemical action themselves, they may no doubt alter the chemico-vital character of the natural secretions, either by subduing power and action, or accelerating or exciting them. For whatever

purposes or reasons they are given, something, for better or worse, or no effect at all, must be the consequence. But they seem never to be depended upon, in any two cases in which they are administered. There is another class of drugs to which some specific actions are attributed by their preparers and fabricators; but which go regularly in and out of fashion. As long as these occult diseases exist, or common and simple maladies are complicated by improper medicines, so long must much speculation exist in medication. There will then, as a matter of course, be always among us plenty of chemists and chemical physicians to find out specifics, when we have come to our wits' end; and for these, there are many who ought to be very grateful, both givers and takers; the one to escape a non-suit, and the other to have the mind satisfied that something is done;—which is with some people quite a mania.

This latter fact is a most serious item in the minds of our best men and keenest observers; who would warn, from their great experience, the rash sufferer from doing too much and making things worse. Between the naturally occult maladies, and those produced by false medication, there is, as I have said, a great difference. The one set are simply incurable, while the other may be relieved by some accidental circumstances; but when they are, our present physiology can give no satisfactory explanation.

Much of this arises from even the limited knowledge of the effects on the system of the distinctive or chemical drugs. Drugs of an opposite character are often combined, such as the liq. amm. acet. or the effervescing medicines. Nothing seems to be known of

the elective chemical actions of the system, which causes one element to be retained and the other to be set free; this always depending upon the balance of natnial requirements. Or, again, of those neutral drugs which have some effect as excitants or detergents; and so disturb or alter the chemico-vital or electro-vital laws, and either reduce or accelerate the calorific heat of the body. Certain it is, that when elements are deficient in the body for its due performance of a healthy status, such as iron, &c., it is almost in vain that we give it to obstinate systems that will not take it up; knowing all the time that the system does manufacture it itself. It always appeared to me, that the safest and best way of proceeding in such cases would be, if we could find out those elements from which the system makes these in her own alembics, to give them, instead of the direct element itself. There is one great annoyance to everybody, namely, that drugs will not do what we want them to do, and what they ought to do, according to our ideas. When this is the case, the wise shake their heads, with many regrets that wisdom and knowledge is yet far off; while their opposites quarrel with their neighbours, and, knowing little themselves, get involved in many words and much strife.

Until, therefore, distinctive diseases are more properly understood, those which are occult may remain as they are. Neither science nor the physician ought to be called in question. The great object at present to be attained, is to get a better knowledge of the *causes* of the distinctive ones, and treat these. NOT their *effects*; which are, as I have previously said, mere myths.

X. There are two singular facts connected with

the present state of medicine, deserving a few remarks ; and these are—an extreme minutiae of diagnosis, and a corresponding distrust of drugs. Formerly it was said that to find out what was the matter, was half way to the cure. This must now be set down as a fallacy ; because the extremely minute diagnosis, as now carried on, ought to have pointed out long ago, a more certain application of the remedies ; whereas the reverse seems to be the case. This shows, more glaringly than ever, the many effects which may be produced from some simple causes, which are nothing more nor less than the altered condition of the different secretions in the body, and their relative value, one towards another, in affecting the general principles of life. The natural disappointment which ensues, in not allaying or relieving certain parts or organs specifically affected, ends in doubting the use of drugs altogether.

Let anyone read the Government Blue Book on the Cholera of 1834, and that on the Rinderpest of 1866, and they will find these observations verified. For the Commissioners appointed to investigate both these diseases, come to precisely similar conclusions, namely, that both diseases baffled all our present physiology ; and that one treatment was as unsatisfactory as another ; and that no medication was of any avail.

We consequently hear on all sides, even from the Introductory Lectures at the opening of the Medical Terms at our Hospitals, the praise of general hygiene in contradistinction to physicking. Yet the cry is still raised for better means to aid diagnosis ; for more instruments ; for more mechanical appliances. The stethoscope has long been in the hands of the profession, to find out every conceivable noise or sound in the

thorax, whether from the heart or lungs. It is astonishing how many these now amount to; but, strange to say, that those from the lungs, in every distinctive form of disease, have been so intermingled, that no stethoscopist has ever attempted to classify them. Those which have been caused by congestion, from those which have arisen from inflammation, have never been distinguished; for they must be totally different. The one disease shows an increased secretion; which loads the tubes, and impedes the air from getting into them. The sequence must follow, that all the noises heard throughout all their ramifications must be very different from those which are heard when there is no such secretion, or probably not enough to resist the action of the atmosphere, which goes in and out and over membranes which are raw and denuded of their proper amount of epithelium or diphtherite; producing sounds evidencing aërial attrition and friction upon the whole of their surfaces. This classification of the noises would indicate what state the lungs, or rather their air tubes, were in. But it has never been done. One great error has been promulgated by physiologists, which is, that the thickened or highly mucous condition has been produced by old inflammations. This I deny *in toto*. The congestive state arises *per se* from excess of vital powers, producing excess of the elements of life. I will demonstrate this from the fact, that when perfect bronchitis occurs, the difficulty is for the air tubes to retain the healthy deposit of the epithelium to make a perfect lining to their coats. No sooner is the attempt made, than it all comes away as soon as formed; and if that peculiar cotton-wool expectoration which occurs in this state, be

mechanically analysed and drawn out, the threads or fibres will be seen, which had occupied every air-tube. As a mass, it may appear conglomerate to the casual observer, as if it came from a vomica, but it is in fact simply condensed tubular mucus. When once these tubes can get naturally lined again, they return to a state of integrity. That many fail in their observations of the stethoscopic signs and indications, is proved by their conclusions. I have seen a multitude of cases of patients who have been pronounced twenty years before, as not having any sound state of lungs at all; or with one lung gone;—and yet they have continued to live in spite of these dicta; and at the end of this time having both lungs perfect. Some thirty years ago, emerging from a hospital where the stethoscope and auscultation were most minutely studied; I had every reason to believe I was very proficient in the use of these diagnostic aids, and I conceived the idea then of classifying all sounds. But I soon found I was pursuing a ‘Will-o’-th’-wisp;’ for every step I took, led me more to the general causes which produced these phenomena, and therefore more useful for the medical purposes of repairing them. I also found that minute diagnosis, led more to erudition than to cure. I know many ardent auscultators and stethoscopists who have felt much disappointment in these studies. Let me not for one moment be understood to decry the use of the stethoscope, as an assistant to every other possible means of diagnosis; or the desire for more mechanical aids to this end. I may at least be allowed to say, from my own experience, as well as what I have heard from other enquirers; that when the number of effects produced from a lost balance of the principles

on which life and health depend, are increasingly developed by all these means without a corresponding benefit. That they are not so valuable as they are generally believed to be, because the opinions formed from them, are often found to be incorrect or falsified. If our practice of medicine was only designed to show, what wonderful departures from a healthy standard the human system is capable of; then we have arrived at the minutest detail already. We scarcely want any addition to their phenomena. But if the end of medicine be to cure, what is so clearly pointed out to be wrong; very different modes of procedure must be adopted. Hence we have, as I have said, a greater knowledge of *effects*; a most minute and exhaustive diagnosis; with little reliance on drugs or the true *modus medendi*. Hence also arises a greater reliance on hygiene, and good old Dame Nature to do the rest. But to this I must demur. Hygiene is in just the same predicament as medicine; an equally deficient knowledge of physiology in this, as often directs it wrongly, as in giving medicines; because this said hygiene is based on the same physiology which directs the use of drugs.

The use of the stethoscope has led to the invention of the aurroscope; so that the ears may have a more perfect investigation. The laryngoscope and ophthalmoscope have become extremely fashionable and popular. Beyond the effects seen by them; has a corresponding physiology of their causes or treatment followed? I much doubt it.

I will here mention a proposed means of diagnosis of the gases of the body; by a very ingenious person, who has been engaged all his life in pathological drawings

as well as in the use of the microscope. It is that of 'DRAWING THE BREATH' of individuals, which he terms MICRO-CHEMISTRY; but which might be more appropriately called PNEUMATOGRAPHY. He gives the following account of his discovery, though I do not agree with him in his physiology.

DRAWINGS MADE FROM THE HUMAN BREATH.

Showing an astonishing variety of wonderful and beautiful forms, according to the health of the individual. In every circuit the blood makes through the system, on reaching the pulmonary arteries, it is loaded with the waste and decomposing matters of the body; and while it is in circulation through those vessels this waste is, by a complex series of chemical processes, partially converted into vapour, which, when expired from the lungs and condensed, yields a variety of crystalline forms according to the nature of the changes going on in the blood or other parts of the system.

The crystallisation of minerals, salts, and organic bodies has long been an interesting subject of study to many scientific men, but as yet no discovery has been made as to causes which create such a remarkable variety. Those here shown were taken from the breath of several individuals afflicted with pulmonary disease, and the present discovery enables the artist to reproduce, with the aid of the microscope and camera lucida, exact representations of the breath crystals, which vary so much as to excite astonishment in all who behold them, and lay open a new field of scientific research.

He informs me, he gets a person to breathe through a glass tube on to his object glass; which when well covered by the breath, the cautious use of a spirit lamp drives off the moisture, when certain crystallizations take place. He has submitted sets of five of these

operations to many of the first men in the profession in London, who, like myself, have purchased them. Some forms of crystallization of the breath, or lung gases, of individuals suffering from various diseases, show clearly that they contain *oxalate of lime* and its characteristics; *phosphate of ammonia and magnesium*; *uric acid*; *urate of sodium*; *oxalate of urea*; *carbonate and sulphate of lime*; *chloride of ammonia*, &c. These have been identified by some eminent men for the information of the discoverer. If, then, there are elements of calculi in the breath, it shows that the inorganic fluid elements and gases contain them, equally with the blood; and which might be deposited in their usual places at any time, quite independently of the blood. Distinct soda and potash, appear also to be constituents of the breath, as the crystals show in one drawing, the forms of sea-weed and land plants, such as may be seen on our windows during a frost. However common and domestic such things may seem, I do not think these simple occurrences have had the attention they deserve; from the very fact that our exhaled gases have not been sufficiently investigated, while those generated in our interiors, and are used up and not exhaled, have been wholly ignored. This discovery will, no doubt, go far to prove the truth of the existence of certain elements in the gases thus exhaled; and also in the inorganic fluids, which always accompany them. These, be it understood, are entirely independent of the blood, as well as that the gases of the body contain large amounts of elements, on which it actually depends for some of its wonderful but now hidden vital powers; and which, it will be seen, I have been contending for in this work. I look upon a future power of diagnosis to be derived

from this new science of PNEUMATOGRAPHY with great interest.

Take, for instance, those terrific perspirations, which we often witness in acute inflammatory rheumatisms, or the consecutive sweats of phthisis. These might show the elements which are flying off, and weakening the system, and point to those therapeutical remedies which would supply them. Or, on the other hand, demonstrate what elements were in excess in the body, causing injurious actions, which might be corrected. This will open a large and fertile field, accompanying discovery of cause, with a therapeutical remedy. All other means of diagnosis, seem to lead to the effects produced by disease; wonderful and manifold as they are, and varied by every idiosyncrasy, leaving the treatment to the mercy of every varying opinion, to do that which seems best; and we all know the axiom, ‘*Quot homines tot sententiæ.*’

If gases are thus to be seen, and microscopically analysed, on their exit from the body; and as we descant largely on the mephitic gases causing disease, when taken by the breath or bodily into the system; we should surely endeavour to trace the beneficial uses of others. I have heard that at the great alkali factories at Glasgow, and a large area round them, there is a perfect immunity from fevers of all kinds; no doubt, owing to the strong impregnation of the atmosphere with acid fumes. In many manufactories, where the chlorines are employed largely; the particular department where they are most used is reserved by the proprietors for any one in their establishment who has lost flesh, or ails in any way, or has any tendency to consumption; and in a short time they gain flesh and vigour. Even those on their staff who have been habitual drinkers

are placed in this department, and, as a proprietor assured me, they soon recover from their pernicious habits, and become changed in character. These things evidently show the effects of gaseous aura on the system in a therapeutical light.

Such facts as are here shown, surely cannot fail to open the eyes of the medical profession, naturalists, and scientific men generally to the value of the gases in the body, and what are also floating around us and generated in the air we breathe, and in the water. We have a right to ask ourselves more questions as to the electric currents 'always running to and fro in the earth, sometimes entering the telegraphic wires, and sending streams of electricity through the lines of sufficient strength to overpower the working batteries; to stop telegraphic news, and to send unreadable messages on their own account.' It cannot be said these are of organic origin; they are evidently the result of combinations of inorganic matter. I have endeavoured to show, when speaking of the nerves, that they are *bonâ fide* the wires of the body to transmit the currents of motor and sentient actions, produced by the inorganic elements of the body, precisely as earth currents and batteries produce the electric aura. A nerve does not produce electric currents more than a wire; both are only conveyers of the currents; and these currents, both in nature, in the earth, air, or water, as well as in vegetable or animal life, are produced in a similar manner by their inorganic elements.

As regards the effects and general laws of the gases in the system, I will just record the following fact.

Some few years since I was called in to see a gentleman who had died from the fumes of charcoal. He was a

fair man, with sandy hair and beard. He was very little discoloured at this time, but in three days afterwards, when I saw his body at the inquest, I was astonished at seeing a perfect Ethiopian, except in features. Every part of his body was intensely black. Now, all circulation had ceased at his death; but in the three days after, the carbonic acid gases had had full range, and had completely dyed his rete mucosum. The blood in this case could have had nothing whatever to do with the effect described.

From all I have written; let me ask any unprejudiced man, if he is able to gather such an amount of information for his own guidance, which it may be supposed he ought to do, by reading the hosts of cases constantly recorded in our medical journals; setting forth every phase of the effects of certain diseases and their treatment. Or from works on specific diseases which issue from the press, with their authors' opinions; all based on our present dogmas on physiology, but settling nothing. Surely the practice of medicine is not to begin and end with the diagnosis and record of the effects of disease; when its ultimate end is a sound therapeutical treatment. I will illustrate what I mean by a few short criticisms on the last volume of the 'Royal Medico-Chirurgical Transactions,' Second Series, vol. xxxii. 1867; as giving the best specimens of recorded diseases and cases; and because all such have been read and discussed before a learned society and published by them. I will comment on those points, which I have introduced in these pages, as necessary to unravel the mystery of organic life, both in health and disease.

The first paper relates to two successful operations of Ovariectomy.

Surgical operations seem now to leave nothing to be desired; whilst the success of the operation and the true safety of the patient, depend upon the after medical treatment; therapeutical, mechanical, or natural; that is, when, where, or how Nature can be assisted. The author of the paper says that in the first case, after operation, '*the bowels acted for the first time on the thirteenth day,*' and in the second, '*on the twelfth day.*' The only observation made on these facts is that *there had been no uneasiness from the prolonged constipation.* How long has this plan of non-coercion of the bowels in certain states been adopted?—so contrary as it is to all received opinion, respecting the absolute necessity of daily alvine actions, and the great evil and danger pointed out by a thousand authors as apt to occur when this is neglected. Here a surgeon dares to brave one of the greatest dogmas of the schools. Science surely cannot be satisfied with such new and unheard-of treatment, without being informed of a philosophy for it; yet none is given. A surgeon of repute does it, as the result of his experience; and simply says, his patient felt '*no uneasiness from the prolonged constipation.*' Let me here tell him, that it was to a great extent owing to this very conservancy of the contents of the colon in both cases, that the patients did so well; and this too upon the physiological principles I have herein laid down.

Another paper is on 'Two Cases of Periodical Inflammation of the Right Knee Joint, with Remarks.' It exhausts all that can be said on the curiosity of effects; but no causes, properly so-called, are given; for the causes named, such as ague, neuralgia, &c., are only themselves EFFECTS. Here, then, is simply a narration of something occult.

In another paper, 'On the Nature of the Waxy, Lardaceous, or Amyloid Deposit.' Many conditions of the body are related, as exciting causes for these deposits; all of which are implied to be excretions from the blood. Now I have shown that it is most improbable, that fat can be a secretion of the blood; and this paper goes far to prove the correctness of my views on the subject. The disease is said by the author to be '*the result of agency ubiquitous and simultaneous throughout the system.*' So that it may be inferred, that the blood vessels have this deposit along their coats equally with all parts outside them. Now if the blood contained fat or any oleaginous matter, beyond the due amount necessary to prevent actual friction, from the blood circulation in the vessels; what could prevent its accumulation at any given part in them at any time, and so stop circulation entirely? Neither the common temperature of the blood nor even excess of this, could possibly keep such a mass in a state of liquefaction. Or, again, on the sudden accession of cold; condensing this supposititious fat in the blood; circulation would cease immediately. The very fact of the coats of the arteries being loaded with this '*waxy, lardaceous, or amyloid*' deposit, shows at once, that it is a foreign element. Then, again, if fat was a deposit from the blood: we have to reason on its exit or elimination, in the same way as we do in everything else. Thus: that all ethereal or aqueous matter would be first exhaled from their substances. When this is done, inspissation of the residue is a natural result. Our present physiology would say; but there are other elements always coming in to liquefy this again. Then I have only to rejoin, Why do they not perform this act when the waxy and

lardaceous product is blocking up and loading their coats? But it appears clear to me, that this disposition to make the fat waxy, lardaceous, and amyloid; is the result of the imperfect state of the natural union of the gases within the body, which are carrying more solid morbid elements, whether from 'syphilis,' 'pus,' or anything else. Also that the inorganic fluids, being more condensed, the natural fat of the body becomes waxy, or contains less aqueous or oily matter. And, that these phenomena appear as much relatively in the small quantity of oleaginous matter in the blood, as they do in parts outside them. The author says: 'That not only does pus contain alkaline salts in the amount stated, but that these salts are much more abundant in pus *than in the blood from which the secretion is derived.*' Then, they must surely come from another source, and not from the blood. Again, as to the disease itself; which the author has taken so much pains to elucidate, he leaves his subject in a most unsatisfactory state, and says: 'What other causes produce the disorder, and whether there are conditions which render the system more than usually liable to be affected by such processes as have been designated, are questions as yet unanswered.' In which I perfectly agree, because there is no truth in the physiology bearing upon them; the laws of the gases being entirely left out, and the fanciful theories of fat being deposited from the blood all wrong; in fact, totally impossible.

Another paper is 'On the Condition of the Urine in Three Cases of Epilepsy.' A vast amount of labour is here spent upon nothing worth knowing; for the author says, 'All that can be derived from it is, there is no constant change in the urine, though there *appears*

to be some connection between the occurrence of the fits and increase of water and urea, and this increase is subsequent to the occurrence of the fits.' This paper is written on the supposition that all the urine, viz. the organic elements or salts, and the inorganic elements or water, a menstruum, come alike from the blood; which I contend is not the case. The organic alone comes from the blood; the menstruum is derived from the fat about the kidneys. The fits disturb every element in the body, and so excite action both in the parts where the menstruum is formed, as well as greater activity in the kidneys themselves. Here again, we see a yearning after some effects produced by some disease; but science gains nothing by it.

The next papers I shall comment upon are, 'On the Pathology and Treatment of Cholera;' and, 'On the Treatment of Cholera and Epidemic Diarrhœa, with a Record of Cases.' How much has been written on these subjects, and to what end? The answer appears too patent: namely, to uphold dogmas on specific poison: and that this shall be blood poison; and to advance every writer's peculiar ideas on its treatment. Certainly, poison may exist; that, I do not deny: but what I deny is, that those who take the poison in any way, take it as a specific element, independent of what poisons they themselves have within themselves, which are excited into action by any addition thereto. I found this upon the simple fact; that in any community, many imbibe in some way the same supposed elementary poison; and in some it results in the disease, while others are exempt. I deny also, that this disease is wholly and entirely the result of contagion or infection; inasmuch as man is a poison generator *per se*, that he cannot live without his poisons, and that his system

may engender cholera itself, even without any extraneous exciting element. I deny also, in toto, the generally received opinion, that this mephitic poison *enters the circulation before it gives rise to its characteristic effects*; which the author of this paper thus clearly and distinctly asserts. Why is only one class of fluids, the blood, to be stigmatised as the only offending retainer of any poison, in preference to that large amount of inorganic fluid present everywhere throughout the body, with entirely independent laws of formation and use? The gases too, which are carrying with them so large an amount of the vitalising elements of the body in a gaseous state must surely contain them also! If this said cholera poison is 'swallowed' and enters the system through the '*alimentary canal, or is taken in with the air through the lungs*'; we have it equally distributed throughout the system in a very short time. In the organic fluids, such as the venous and arterial blood: in the inorganic fluids, which have nothing to do with the blood and in the gases, which are independent of both; yet all in the smallest space of time intermingling and coalescing inextricably. We are told that this cholera poison obeys the laws of every known poison, by invading and poisoning the blood alone; and if any one is bold enough to deny this, as I do now, most emphatically; then, that '*a general law of physiology is suspended.*' This may be so, as physiology is now believed and understood, but I disbelieve this very physiology itself; and some day it will be found perfectly untenable, as well as any doctrine, coming from whatever authority, which 'would alone render it probable that the blood is the receptacle of the poison, and the vehicle by which its influence is transmitted to the various tissues and

organs.' We do not want natural laws to be suspended ; but it is very evident, we want 'the general law of physiology,' as now believed, to be very considerably modified. The author's theory of the invasion of cholera is, that the poison is first latent in the system, 'producing a host of disquieting symptoms and general malaise,' lasting over a given time, long or short, and then it bursts out in its well-known form. All the reasoning and logic which follow on this blood-poison theory, are scarcely worth noticing ; because they are based on entirely false doctrines ; while the pathological indications are treated in the same manner, in order to arrive at a definite conclusion, which could not have been brought about by the blood poison alone ; but must have reference to the phenomena of all other adjuncts to a vital condition. If this part of the author's paper be carefully investigated, there will be found many most opposing phenomena, which neither he nor any one believing in a blood poison alone, can clear up or explain. The author says, 'The stream of blood through the lungs is the channel by which oxygen is introduced into the system.' He then reasons upon this, and shows that when cholera collapse ensues, the system loses this natural oxydation, because the current of oxygen is reduced in them. As if this was the only one ! He omits the fifteen lbs. pressure on every square inch, as well as the immense amount of oxygen constantly swallowed and circulating both in the inorganic fluids as well as in the gases. That the oxygen of the air is the natural pabulum to the lungs, there can be no doubt, and that much blood is oxydised there ; but to suppose the blood is wholly oxydised in the lungs alone is certainly erroneous.

The general state of the secretions in persons suffering from cholera is entirely ignored. One form, and one physiological law, seems only to be recognised. This will always make the greatest difference in the treatment. If one school recognises the expulsive process, to get rid of the poison ; and another, the repressive, to stop the natural discharge ; they may be sometimes both right, and sometimes both wrong ; and if occasionally both plans succeed, they cannot tell why, or the reason they so often fail.

The other paper, 'On the Treatment of Cholera, &c.,' opens, ominously, with the following admission : 'There are few subjects connected with medical science upon which greater diversity of opinion exists, than upon the nature and treatment of cholera.' I have carefully read all the cases given, in which the expulsive treatment by purgatives has had the fullest trial. It may, in fact, be called the castor-oil treatment. Beyond admitting a cholera poison ; what are we to learn from all the effects, and nothing but effects, recorded ? There appear to be no discriminating observations on the losses of the inorganic fluids, which the system has sustained, owing to the previous losses of the gases from which they are formed. No other use has been ascribed to the castor-oil treatment, but that of an expulsive ; whereas, some value ought to be attached to the chemical elements of the drug, namely, its fatty and oily matter ; and I am inclined to think that if the experimenters of the castor-oil treatment, were to add the same quantity of olive oil, that their success would be greater, because it would furnish the system with much of the fatty matter which it loses, and consequently the lubricating inorganic elements which fat contains, and

which makes it the legitimate 'oil-can' of the body. In the inflammatory conditions of some of the patients; the attrition and friction which naturally follow from the oxygen absorbed by the system would be resisted by oleaginous doses. Several cases which were lost during this stage, might perhaps have been saved by the free administration of any of the acids, or mineral tonics; whereas, in some, the very opposites were given: such as chlorate of potash and carbonate of soda (Case 15). There is throughout all these cases the simple doing, that which seems best in the physician's eyes, without regard to the balance of, or state of those secretions which, combining by given laws, sustain vitality.

What I have advanced on the law of idiosyncrasy is here fully and perfectly confirmed. The authors say, '*Almost every case had something peculiar to itself, and modified its treatment.*' Of course it had! and it is for this reason I advocate a general law of causes: namely, to correct, on the one hand, that which is super-vital or in excess in the system; and, on the other, to add those elements which may be deficient. This is in contradistinction to the classification of effects, which differ in every individual. But what is most startling to me is the following piece of advice: '*The safest rule in using castor oil, is that there should be no general rule at all.*' Now, it does appear most manifest, that as cholera every year employs so many pens and minds, and that there is so much diversity of opinion respecting it, that this fact will always obtain, unless some bold innovation is made in physiology. The old nursery story will hold good to the end of time:—If water won't quench fire; fire won't burn stick; stick won't beat dog; dog won't bite pig; and the said pig will never get over the

stile. Now in cholera, some poison evidently changes the natural union and combination of all vital elements. The gases are evidently the first to become changed, and so alter their combinations, that inorganic fluids cannot be formed; consequently, there is a cessation of fat formation as a sequence. All fatty and all oleaginous matter becomes affected, and discharge their aqueous and oleaginous properties on the one hand, or become exhausted on the other. The blood is soon influenced by this, and is altered in character, which is shown in the cases cited and by the pathological conditions after death. Two distinct states are here revealed: the system may become anæmic, which shows loss of both fibrine and liquor sanguinis; or the blood becomes more fibrinous, in proportion to its bulk; which may be only from the greater loss of its liquor sanguinis, whilst the fibrine is retained. This last condition gives rise to all the febrile and inflammatory actions, dry heat, thirst, &c., simply from the want of the inorganic fluid elements, which neither the gases nor the fat can now supply. This is readily accounted for, as the hydrogens, not being any longer generated, owing to the absence of the natural manure in the colon which has been purged away; oxygen wears out the system, which is in a state of attrition and friction from the absence of the inorganic fluids. In the anæmic state, the fibrine has been lost along with the liquor sanguinis. All is lost, not from any specific emptying of the blood vessels; but because there have ceased to be fresh supplies. Simple exhaustion has done the business well enough. All these causes are quite ample to show the pathological conditions found after death; but the conclusions arrived at from them

I do not consider at all sound. As there are so many symptoms in cholera, resembling so many which occur in other diseases; and as everyone is so baffled at coming to any conclusion, which can or will satisfy everybody; it must be evident that there are considerations still left out, why this medical pig cannot get over the stile.

The next paper treats 'Of the Influence of Weather and Season upon Public Health.' Here it is evident the gases are brought into prominent consideration. Now weather and season imply different temperatures and 'the way of the wind.' We speak of the air as the atmosphere we live in. We speak of the same in mines, as their gases, and use the same terms of the air generated within or radiating from our own bodies; but we are accustomed to say, we inhale air into our lungs and expire gases. If, however, chemists have reduced the properties of atmospheric air to certain gaseous constituents; why may not the one single term be used for all, and call every one of these by the generic term of GAS or GASES? Whatever alteration takes place in the atmospheric gases, some bodies are so sensitive that they immediately sympathise with the changes of 'weather and seasons' and the direction of the wind. Some, nay many persons, and even animals, are far from feeling comfortable in an east wind, while others rejoice in it. I have known many men never so elastic or buoyant as in an east wind. I need scarcely mention the unanimity of the profession in prescribing different climates, in certain states and conditions of their patients. It comes to this; the gases of the atmosphere exercise both beneficial and prejudicial influences on animal life. It is worth asking, as I

have written so much on the gases generated in the body, in order to set a value on the paper on which I am commenting :—Does gas first combine with gas, and does this combination affect in a secondary manner the whole amount of the fluid secretions of the body, and these again the solids? I am, I think, right in reasoning thus; because, if this is admitted, we must also admit, that all those matters which make up the principles of life, assume a consecutive form of alliance. Thus, gas affects other gases first: these in their altered character probably affect inorganic fluids first; these again the organic; and both combined affect the solids. In the great consecutive wheel of combination, the gases are again influenced, because of the impossibility of disuniting any of the properties of the body. Exhalation of gases from morbid products are their last act; while the combination of new or fresh ones to form other elements, are among the first acts of vitality. This long paper is accompanied by seven elaborate diagrams, all thoroughly in accordance with the spirit of the age in its pursuit after effects, to the neglect of causes.

The next paper is, ‘On the Influence of Inadequate Operations on the Theory of Cancer.’ This is one of the ‘obscure’ or ‘occult’ diseases, and such a subject gives any author a long tether for speculation, ending in nothing definite. Nor can anything approaching definition be arrived at, until the organic and inorganic elements be more distinctively recognised, and the influence of the gases upon these. There is only one observation worth quoting, namely, ‘that consequently, *centrifugal dispersion*, not *organic origin*, determines the recurrence of cancer.’ ‘*Centrifugal dispersion*,’ may mean the distribution of the inorganic fluid ele-

ments and gases, in contradistinction to any 'organic origin;' by which the author may imply 'blood poison,' or any other hypothesis.

The paper 'On Syphilisation' may be dismissed in the words of the author, that,—'We are decidedly of opinion that syphilisation is not a treatment which can be recommended for adoption.' When the present physiology gives place to more enlarged views thereon; proper prophylactic remedies will be found at hand to meet all the wants required, and this without the use of the vile mercurials.

The next paper on 'The Temperature and the Urine in Typhus Fever:' is another illustration of the heaping up and searching into a vast amount of chaff, for the grain of corn; which, however, is never found. It will be seen here, that no two cases are alike: some show a rise of temperature, 'and continue so for a day or two without there being any assignable cause;' and again, 'in eight of these no distinct cause could be discovered for its occurrence; nor yet, with rapid rise and continued elevation of temperature,' could anything definite be foretold. As for irregularities between the rise of temperature and the pulse; the more numerous the cases, the greater number of these facts would no doubt be noticed. Then, as to the urine; we find the usual difference of opinion amongst authors duly recorded, and such loose physiology as this, on presumed 'retained urine:' 'not that there is lessened formation of urea, but that it is not eliminated at this period; but retained in the system, to be discharged later in the disease.' Now if the aqueous matter of the urine was eliminated from the blood, at the same time as the urea and other salts; what could prevent the whole mass from passing

down the ureters into the bladder? But as the aqueous matter is eliminated from the fat opposite to, and in apposition with, the indentation of the pelvic portion of the kidneys; and this inorganic fluid element not being in sufficient quantity, it is evident that the urea and the salts secreted by the kidneys are waiting for their natural diluents. In no other way can this phenomenon be explained. Let physiologists once admit, that these two most important fluid elements in the system, namely, the *organic* or structural, comes from the blood; and that the *inorganic*, is made from the combination of the gases and is entirely independent of the blood:—then many things, which are now not to be accounted for, especially in fevers, would be more manifest. All the analyses and observations made on the urine under all circumstances of diet and conditions of the patient lead to nothing; as all these matters in the cases recorded plainly show. It is curious how near men approach a truth, without knowing it. In the observations on the amount of ‘urinary water,’ the author says, ‘I think we may state in a general way that the amount of water excreted by the kidneys is diminished both before and during the lysis and for a variable time afterwards; but that, about the end of the third week of convalescence, the quantity passed has reached the normal rate or more.’ In other words, if science and truth were to say; that during fever, owing to the failure of the gases in making inorganic fluids, and those which were present having been used and exhausted, the structural or organic fluids continuing to secrete their proper elements, have no menstruum in which they can be carried off. But as soon as the system can manufacture its due amount of inorganic fluid elements, and

these can again dilute the structural; then Nature returns to her normal state. It is nothing but labour in vain to go on theorising as we do, and heaping up effects, if we are never to arrive at the causes of them. Taking the colour of the 'urine,' the 'rash,' 'sleep,' 'complexion,' 'bowels,' 'thirst,' and every account of them; there is nothing to be learnt as causes in all the cases here so carefully and so minutely described. As to the treatment by therapeutics; it offers no guide to the student of medicine, because neither philosophy nor physiology enter into the matter. Sometimes a right remedy seems hit upon, but wrong ones are oftener followed. Patients get better or worse; without the possibility of explanation how or why? The balance of health comes about by or through certain unerring laws, whether by some *vis medicatrix Naturæ* and in spite of the doctor; or dissolution takes place, which he is just as likely to have aided with the very best intentions, while endeavouring to do the reverse. All the credit that is due to this paper is the labour and pains taken to prove *nothing*; as it throws no more light on the great subject of fever.

The paper on 'Amaurosis supposed to be due to Tobacco;' is not satisfactory, except so far as it ventilates the subject, and suggests to the public the probability of loss of sight from excess of smoking, and so deter many foolish persons from such excess, and lead to moderation in the practice; which I do not consider prejudicial in moderation. In reading the symptoms of these cases; it appears evident that the author has not the least idea of the great sympathies there are between the colon and the reflective portions of the brain. The loose way in which headaches are mentioned, without

distinguishing them as frontal, occipital, temporal, &c., indicating as they do the sympathies of varied organs. Neither is there mention made of that peculiar state of the colon which materially affects the brain and the eyes; nor of the effects produced by the mercurials and cathartics. Amaurosis must therefore of necessity be ranked amongst the occult diseases; because most important points in physiology bearing upon the question, are wholly left out of the calculation.

The next paper I shall comment upon is that 'On the Inoculation of Animals as a Means of Diagnosis in Tubercular Phthisis.' Now this opens up a wide subject. There was first the inoculation of small-pox, which was superseded by vaccination. Then, as a therapeutic agent, hypodermatisation has been practised. Anon, we have syphilisation and now tubercularisation. It shows how many supposititious principles may arise out of one great truth. It was thought that as small-pox appeared so regularly with the advent of new life, under whatever condition, from the peer to the peasant; so that, neither pure air, nor cleanliness, were better than poverty or dirt; the elements of small-pox existed in every individual. Under these circumstances a suggestion arose; that it would be better to induce it at once by inoculation, than to let the system wait and develop itself, the pustular cleansing of the body from this specific poison; seemingly the inheritance of everybody. Somehow it appeared, that the small-pox element was more virulent in human beings than in the cow; consequently the small-pox of the cow became substituted, and the excrementitious virus of her pustules, was inoculated into the human system, before the latent

small-pox poison assumed any force therein. Now it is a curious fact; that when the cow's small-pox is fully developed on its udder, the animal does not seem much the worse, and her milk is still marketable, and perhaps none the worse to the human family who drink it. We should not fancy it, however, if we knew it. Thus, inoculation and vaccination gradually led up to the idea, that cholera and fever poisons might be similar in character, and have their specifics. We have seen syphilisation tried, but which, I hope, will be properly banished from English practice; and that no enthusiast will attempt either tubercularisation or cholerisation. What we must first get rid of is, that terrible myth BLOOD POISON, and reflect on the nature and character of any virus inoculated into the system, and what elements therein are first affected, independent of the blood. In the papers on cholera, already remarked upon, the authors have expressed their opinions to the echo, that some poison assails the system, remains there for a given time, and affects it in certain ways; but not until the *blood itself* is impregnated with it, are the true effects seen. All which reasoning I hold to be utterly fallacious. Such arguments stop all enquiry and all philosophy, and give to one class of fluids all the evil; whereas there are other secretions and substances which make up vital being, of equal importance to be considered. The poet says:—

Through what variety of untried being,
Through what new scenes and dangers must we pass!
The wide, the unbounded prospect lies before us.

I say, through what variety of gases and secretions, interstices, fasciæ and solids must this dangerous poison pass, before it affects the blood at all! The prospect here

is indeed both wide and unbounded. In the paper on the influence of the atmosphere and temperature on health or sickness, gases enter into our consideration ; so they do in all mephitic atmospheres to which we attribute a host of diseases. So, again, with impurities in water. Are these to be considered wholly and entirely organic elements, influencing only the organic elements of the body ; or are they to be considered mephitic agents of an inorganic character, whose first effects impinge upon the vast amount of inorganic elements of the body ? What are the elements, which we vaccinate, inoculate, syphilate, or tuberculate the system with ? The answer is obvious ;—inorganic excrementitious matter ! What is the virus of small-pox or cow-pox ? What is that from a chancre or an indurated syphilitic sore ? What is that from the sputa or expectorated matter of phthisis ? All are excrementitious, as much as fæces or sweat or anything else of the same character. Instance the puncture of the finger in opening a dead body after a death from peritonitis. We do not inoculate, syphilate, tuberculate or puncture with blood ; nor with any elements of the blood ; or with anything which has any affinity with the blood, but with the excrementitious matters of sores, ulcers, and sputa. We have a right, then, to inquire into and philosophise on the effect of these inorganic excrementitious substances, (which are the surface poisons generated in the system, and are inorganic in their character,) upon those substances and secretions of the body to which they are more nearly allied ; and through their union with which, they first obey a law of traversing the whole body. Then, after affecting all inorganic elements, gases, &c., the struc-

tural or organic elements, the blood, cannot fail to receive them and be influenced by them: and where these are so influenced, that they do not derive more force or virulence in consequence, and certainly not to be dignified by the name of pure and specific *blood poisons* alone. I hold that their effects are equally potent on the inorganic elements; for neither can be separated, nor can one be greater or less than the other, in the great sum of all those matters which make up the principles of organic life. I have already said that earth and minerals contain properties which become vitalised and organic; but while they are in the earth or minerals they are inorganic. I am also firmly of opinion, that the greater part of all vegetable matter is inorganic, and that only the elements which germinate from their seed have a small portion of organic matter. Also, that all zoophites or those animal matters which are so nearly allied to the vegetable kingdom, are in their greater proportions inorganic. Science had its throes in admitting the sponges and corals into the animal fauna. All insects, reptiles, fishes, and all this kingdom of vital life, and all their ova or eggs, appear to me to be made up in far greater proportions of the inorganic than organic elements; and it is only in the rise in the scale of animal existence, that we get a true proportion between the gases and the inorganic and organic elements. Even the different foods which all animals take are inorganic, and mix with their inorganic elements first; throwing off their gases, and making inorganic fluid elements, and not until the third process is arrived at, do they become organic and true structural matter. Therefore science, as it is now viewed, must swallow many a bitter pill before it can

arrive at any truth at all; and must give up many of its prejudices, above all, that *bête noir*—BLOOD POISONS.

I take the two following papers, ‘Contributions to the Pathology of Aneurisms and Tumours,’ and ‘On the Repair of Arteries and Veins after Injury.’ Valuable as these are, they yet fail in force because so many interesting laws in the vital economy have no place in their explanation, especially where the inorganic elements and gases play so distinguished a part. Witness in all tumours, whether aneurismal or otherwise, the large amount of tissue, fat, and other inorganic matter, which always, more or less, accompany them. Witness the processes of repair of vessels. The authors say, at page 482: ‘It is a point of the greatest interest to determine the nature of the transparent tissue which occupies the opening made in an artery three days after injury, for this is the material by which the wound is temporarily repaired.’ ‘Upon the formation of fibrin in the blood, the development of tissue and the formation of lymph upon serous membranes in inflammation, we have arrived at the conclusion that this adventitious tissue occupying the wound is *closely allied to, though not probably identical with, ordinary fibrin from the blood.*’ ‘Although there is a difference in the microscopical characters of ordinary fibrin deposited from the blood and undoubted lymph formed upon the surface of a recent wound or upon serous membrane in inflammation, we think this difference may be due to the different conditions under which the deposition of the *insoluble material occurs.* At any rate, we have seen fibrin undoubtedly deposited from the blood, which exhibited no fibrous or fibroid appearance whatever. . . . And, on the other hand, we

have seen specimens of *unquestionable lymph* recently formed upon the surface of the peritoneum which could not, we think, have been distinguished by its microscopical characters or its behaviour with acetic acid or potash, from true fibrin.' Exactly so; and I quote thus largely, to draw the especial attention of the orthodox to what follows these extracts down the same page 483. I have already in the body of this work pointed out that repairs of all injuries are perhaps more indebted to the inorganic fluid elements and the gases, than to any other source, and that blood alone supplies the smallest portion, because the actual structure to be repaired by that element is in less proportion than the inorganic. Therefore, we have a right to believe that when inorganic structure is damaged, that it depends principally upon its own elements for repair, and not only this, but it supplies the fluid menstruum to the blood deposits for the repair of actual structures, without which they could not perform their legitimate physiological duties.

The last paper in this volume of the Royal Medico-Chirurgical Transactions is the 'Report of the Scientific Committee appointed to investigate the Physiological and Therapeutical Effects of the Hypodermic Method of Injection.' The process of Hypodermatisation of drugs is, to see if any valuable results can be obtained by introducing them into the body in certain diseases through the skin, in place of the usual manner of taking them. I would therefore ask the question whether 'Science' and 'Physiology' have had anything to do with this investigation, in furthering any discovery of new laws in the system, not heretofore admitted, or whether three phases of this investigation only

have been thought of. The first, of how soon, according to the current dogmas of the schools, certain elements will enter the blood; the second, the behaviour of this upon the nervous system; and, thirdly, the general effects produced. Now, if these are all the points which have been considered, all I can say is, that much valuable labour has been lost, at all events for the present. I have a right to ask, What are drugs *per se*? Are they organic or inorganic? Are they vital or non-vital of themselves? that is, in the state we either prescribe them or hypodermate them. Are they to be viewed in any other light than elements which plants absorb from the earth or the air? or animals eat, drink, or absorb? Mind, we are not considering the effects that all these things produce, or how all matter becomes hereafter vitalised. We have only to do with them as we know and see them. I think we must conclude, then, that they are inorganic elements in every sense of the word. Therapentists have discovered, by usage and many experiments, that certain herbs and minerals of themselves, and others manufactured in a peculiar manner, have certain actions on the living body. Hitherto they have been principally used as all diet has been used, by being swallowed. Now their actions are tried by injecting them. If the doctrine in both diet and drugging, vaccinating, inoculating, &c., is to stand, along with ærial and other poisoning, that everything must first go into the blood, before its effects can be shown, as is said of the cholera and other poisons, —then science itself has built up a barrier against its own advancement. Such dogmas as these I hold to be entirely unfounded, and opposed to all natural laws. Take, then, this hypodermic method of injecting in-

ganic elements into the system, and I contend, that those elements which have most affinity for their properties first receive them, and that the system is acted upon by them entirely independent of the blood in the first place ; though in the current, the blood, as a matter of course, gets its due proportion, and shows its effects. If any subtle or colouring element be found in the urine, a certain time after hypodermatisation or injection, is it fair to say, that this has alone passed through the blood, and been eliminated along with the uric and other salts ? I have as much right to say that the inorganic fluid elements and gases have been equally charged with the same properties, and that the menstruum from the fat round the kidneys has carried these into their pelves, in its process of diluting the uric and other salts, as from the blood itself. Many things now discovered in the urine, and supposed to be eliminated from the blood, such as fat, &c., &c., will some day be found to have come from the inorganic elements of the fat round the kidneys.

I have thus shown the quality of matter which now edifies the habitués of a Royal Medical Society, and which it pleases them to issue in the form of their Transactions or Proceedings. They may think they are advancing the science of medicine : I believe they are only showing, in most laborious detail, the effects of a departure from health in whatever phase it may be viewed ; as well as their utter inability to arrive at any therapeutical certainty in medical treatment. The result of all this is, to make medical atheists. In the last generation we saw the proprietor and editor of the old green-backed ‘ Medical Gazette’, after a long life, and when just leaving it, deploring the state of his art,

and declaring that if neither physician, apothecary, surgeon, midwife, or drugs had ever existed, the whole community would have been better off. Some few years later the original proprietor and editor of the 'British and Foreign Medical Quarterly' died;—an atheist in medicine; and gave a last ungenerous stab to his profession by endorsing the opinion, in other language, of the editor of the old 'Medical Gazette.' In our own day, we have a physician respected by us all, retiring from the scene of his labours, full of years, honours, and the Presidency of the Royal College of Physicians; who, in his opening Address to a new clinical society, candidly acknowledges, that we know little or nothing of the application of drugs to disease.

Now these are facts, as well as that there are many such medical atheists in the very highest circles of the profession. I cannot surely be blamed for recording these matters, when the three great luminaries I have cited, confessed these facts themselves. It is sufficient for me to reiterate what is so well known to the best part of the medical profession, and too truly endorsed by the reflecting portion of the laity,—that medicine does not keep pace with other arts or sciences.

If I differ, then, from the physiology upon which the practice of medicine is now founded, I do not repudiate or undervalue the men who profess it. I only claim an equal right to draw my own conclusions from the study of the same book of Nature as themselves. Fair argument is all that is necessary on both sides, the subject itself alone considered, for it is not persons who decide the truth of anything; it is the facts which are produced on any question of science which are found to be most in accordance with natural laws. If men and books

declare some of the great diseases to be the result of certain blood poisons ; or, that all secretions and exertions, and many substances, parts and organs of the body, are made from the blood ; or, that many results, both medical and chemical, arise from some independent vital principle in the body, and so, fall back on a supposition to account for something they do not understand ;—if all these, and many more, are so occult, am I bound to believe them because it is ‘received opinion?’—I say, No ! Nay more, I think it is high time to question much of what is said, written, and believed on all these subjects, particularly as the physiology on which much of it is based, is most unsatisfactory and untrue. Nor do I think physiology will advance unless the educated laity and those who study natural history, begin to think for themselves, and cease to place entire confidence on that which emanates from the Medical Schools.

LETTERS ON PHYSIOLOGY.

The following THIRTY-THREE LETTERS, published consecutively in 1865, I have revised for this work.

LETTER I.

SIR,—That there is abundant reason for some reform in the ways and doings of the legitimate and diplomated body, there cannot be a doubt; but let me ask you: Do you think that abusing the Faculty themselves, and ridiculing their ways and doings, is the proper method to bring this about? I think not. You, no doubt, are a practitioner of Medicine of some standing, but are you without your prejudices? Are you not confirmed in certain modes of thought and practice, which everybody acquires without exception in a very few years after he leaves his Alma Mater? The physicians at the hospitals, under whom you thought you were learning the practice of Medicine;—do you follow their dogmas now, or, have you formed new ones for your own guidance, as everybody else does? Very different, by the way, from any you were taught; yet, how much of what you have elicited

yourself is true or false? These are facts put to yourself as an individual, but only for the sake of their being addressed to everybody in the same position. What makes you think, like many others, that you could treat a case better than your neighbour, and that such and such a person would have got over his disease had you attended him? What constitutes the difference of practice in every man? Is it a higher knowledge of the inward workings of the human system, or is it simply a matter of opinion of him who practises? You must admit it is the latter! When a nobleman asked the first physician in Dublin what his opinion was of Dr. —, as he was under his care, ‘Oh,’ he said, ‘a good fellow—a good fellow, and as good a guess as any of us.’ I think he hit the mark at once; for what is really the practice of Medicine, when you come to think of it, and see how it is practised? Why, it is this: a scheming fancy leads supposition and conjecture into forming an imaginary truth, which becomes perfectly convincing as to the patient’s disease and sufferings. This suggests a hodge-podge from the Pharmacopœia, on a bit of paper, in true cabalistic formula, and, in all the magnanimity of thought, the writer reposes in his wisdom and his arm-chair. The retreating steps of the patient have died away. Science has done its best,—science did I say?—but I didn’t mean it. Art and mystery have done their best; and if the skilful empiric’s thoughts could but be read, they would amount to this: ‘Ah, there was evidently an engorged portal condition, no doubt of it: go, my faithful formula, to that man’s liver; purge it, cleanse it, relieve the system of impure matter generally; correct the state of the secre-

tions, restore vital elements, and let there be new life and vigour throughout.' The stomach receives the cabalistic compound. 'Sent here for the liver, are you, by special orders? We'll see about that; nothing comes to me but what I do the same with, in every case; every part shall have a share, for share and share alike is my motto. I am no respecter of things or persons, for so unselfish am I, that I myself take my own share, and benefit or suffer alike with all my neighbours and friends. Alas! I may add, I take the heaviest burdens on myself. I am the first to be nauseated and disgusted, but, true to my purpose and my laws, I distribute it.' 'What on earth,' roars out the primary secretions, 'have you sent us?' The absorbents, astonished, as well they may be, cry out, 'What will the blood say to this?' The arterial blood soon exclaims, 'I am poisoned!' 'Whatever,' cries the venous blood, 'will the liver say when I go there robbed of my biliary elements?' 'I can't,' calls out the liver, 'make bile from this stuff!' The stomach cries out, 'You must.' 'What!' says the liver, 'I who have but a simple duty to perform, and will and can do it with proper materials, am to be found fault with because I don't act? I do act; but who is finding fault with me? As well find fault with a loom for not turning out a silken fabric when a cotton staple was only put into it.' The poor patient goes back to the doctor: 'Well, how are you?' 'Not well; not even better; worse, if anything.' 'What! won't the liver act?' 'No, Sir; he says you have so changed the condition of the blood, that it has none of the constituents of bile.' 'What! He's a donkey! He's idle! I'll soon see the reason why he won't

work! We'll double the doses!' 'The blood, Sir, says you have poisoned him.' 'Confound the blood; I've nothing to do with the blood.' 'The primary secretions said they were all upset, and told the absorbents to take away the rubbish you sent them as quickly as possible; but it altered them very much.' 'I don't care for them; they are nothing to me. But why didn't the stomach send my medicine to the liver?' 'The stomach, Sir, was the first to rebel, and said he was no respecter of things, and should send it about everywhere, to everyone, all over the body. It made my head ache!' 'What the deuce has the head to do with it?' 'It said it couldn't stand it.' 'Oh, stop, I'll attend to the head directly; he sha'n't complain for nothing. I'll send something there pretty quickly.' Then come more cabalistics, increased doses, every organ found fault with, and Nature herself condemned, because she will not act in accord with the doctor. Now, Sir, how can she, when all her laws are violated? This, you will see, illustrates the one great fact that now obtains, viz., the treatment of special disease, instead of the correction of the state of those elements which produced it. This fact I have long since observed, that a given state of elementary disturbance will produce in different individuals, according to their idiosyncrasies, specific affections of different organs, and when our authorities on the treatment of these affections are consulted, we find as many opinions as men, and all seem to act as if, whatever was prescribed, was to go direct to the part affected; and so false appreciations of disease follow.

I have for five-and-twenty years endeavoured to get in the thin end of the wedge of some reform in the

practice of Medicine. Ask, therefore, yourself the question, if prejudice does not stop the way with everybody? Now, mark me, it is not to be done by abusing the Faculty of their practices. It is not to be done by any self-appointed set finding fault with the things that be. It is not to be done by one man condemning another man's practice. Abuse is neither argument nor logic. It is sufficient for the day that the public are weary of us and our doings; that they are dissatisfied, and not without cause; that we do not in the middle of the nineteenth century come up to the standard expected of us; that a general mistrust and want of faith have crept into the minds of the laity: but let me say again, that no abuse or scolding and holding up to condemnation that which is now done daily, will avail or produce a better state of things.

May 10, 1865.

LETTER II.

SIR,—In my last letter I alluded to the supposition and guess-work in the practice of Medicine, not only in endeavouring to cheat ourselves into the belief that such or such a disease exists, but to the entirely supposititious way in which such disease is to be treated. Now, Sir, to treat disease is to treat an *ignis fatuus*. If we could say that it did not really exist, we should, to be severely logical, be perfectly right. What is that which we call disease? Give it whatever name you like, for it will take its name from the organ that is attacked. But, as I have previously said, a certain state and condition of the secretions of the body will produce

disease of a given character in different organs and parts of the body of different persons. What, then, are we called upon to treat? That which is an effect, or the cause of that effect? Common sense would naturally say the latter, with a proviso: 'If we knew what it was.' Now, there's the point. To illustrate this, let us take a sickly girl, without actually any disease at all in the system or of any given organ, yet there is not an organ but what is functionally disturbed. Given, a pain in the side. All the world, and the whole faculty besides, say she has a sluggish liver. Well, but she has very cold feet—always cold; legs too. It is hours before she gets warm in bed, and nobody can sleep with cold feet; so she lays awake till the little hours of the morning, when she ought to have had her first sleep. But only when a gradually diffused warmth spreads throughout the body, and there is a regular distribution of caloric, does she doze off into a heavy leaden slumber, and when it is time to get up, she wants to lay longer. How can it be otherwise? Why is the poor liver blamed, because, peradventure, she looks sallow and her alvine secretions are scanty and light-coloured? Suppose the residual blood from all her abdominal viscera contains no elements of bile; are we to lay the blame to the liver as being sluggish for not making it? Did it never occur to all that vast multitude who lay everything to the liver, that probably it was not this poor fellow's fault after all? Her headaches are often insupportable; all because the liver does not act! Constipation is in great force, all for the same reason. Palpitations of the heart, irregular catamenial functions as a matter of course, and a thousand other ailments are present; and are we still to admit this great bugbear

of liver only as the great cause? I fear, Sir, we are sadly wanting in a great and expansive idea of physiology generally, when we contract our minds into so small a compass. If we read authors on the source of caloric in the system, we find them confining their thoughts to great centres. Did it never strike them that there is not a square eighth of an inch of the body that is not a source of caloric? Did it never strike them that there can be no caloric in the body without electricity, and that every square eighth of an inch of the body is an electric battery? When they give to the nerves the sources of ten thousand actions, did they never reflect that these actions must be first given to the nerves themselves?

In their laboratories they act differently. They produce electric and galvanic currents from certain materials, and convey them through substances of their own making—essences of vast force and power, both positive and negative—but they have never attributed to these substances or wires the electric or galvanic aura. Why, then, do they do so with the nerves? Nerves are substances acted on by certain powers, and, like the galvanist's wires, are only agents, not principals.

Here, then, there seems one grand mistake. A simple theory expounds it. Pick a rose, and prick your finger with its thorn. Round the small puncture made, a blush soon arises; this is increased caloric. Does it come from the grand centres and seats of caloric, or from the disturbed square eighth of an inch or less, that received the wound? Admit this latter, and the thing can be further explained. What produced it, and how does the individual know it, and why does the pain

continue—all so small as was the cause? It is simple. Destruction has taken place of an infinitesimal amount of matter which has to be restored to its equilibrium, and this tiny amount of injury has excited the battery to greater electric action—so small and yet so positive that the smallest nerve-fibre has communicated the current to the larger ones, has passed it through ganglions or nerve substances where the force is kept up, and, like a lightning's flash, it is communicated to the sensorium and there appreciated. What is the result? If this was all the nerve had to do, there would be an end of the matter, and no more pain would be felt in the part punctured. This, however, Nature does not allow. Why, then, does the part still feel pain? The cause is just as simple. I have always seen that no positive current ever takes place in traumatic or any other nerve action but that a negative current is immediately returned, and it is through the negative current that the pain is appreciated in the part. As long as pain is felt there, and until the perfect healing of this little wound takes place, the destroyed structure, seeking restoration to integrity, keeps up a constant positive action on the sensorium, and the sensorium its negative action on the destroyed part. This of itself is of great assistance to give vigour to all the elements engaged in restoration, while caloric is always a condition of the parts under restoration, and cannot, in fact, cease; for whether a part be destroyed or regenerated, the necessary inflammation or caloric is set up in that part as a matter of course, and frequently by sympathy in other and distant parts. Wherever action is going on, whether in the usual healthy condition of parts, where waste and repair are always taking place, so it

has its own forces in that part. When it goes on noiselessly, if I may use the phrase, as in a healthy condition it always does, harmony and inappreciability of the fact obtain. Nevertheless, this cannot take place without the same electric actions continuing; for every act, as I have said, is communicated to the sensorium and sympathised with by the negative current, though unfelt. It is only in the disturbance illustrated by the simple puncture of a rose-thorn or prick of a needle that these wonderful and mighty facts become known to us or are appreciated. When I hear how many gastric diseases, how many fevers, how many great affections of the body, are set down to diseases of the great nervous centres—this, to a pyramidal body, that, to the medulla oblongata, and so on—I wonder to myself if ever the practice of Medicine will emancipate itself from such supposititious principles. Depend upon this, Sir; no nerve ever yet was the cause of disease until it had first been made the seat of effect, and then, being so greatly affected itself, the disease that it is said to produce cannot be cured till the first exciting cause—come from whatever quarter it may—has been itself restored. The result is, that the nerve itself recovers simply as an agent, and as an agent restored to its equilibrium, no longer becomes a negatively exciting power. Wonderful, indeed, if the galvanic battery, or the hands and dials that showed the messages being out of order, the wires were to be the subject of blame and doctoring. Such is, then, the same with the nerves.

May 17, 1865.

LETTER III.

SIR,—Physiologists are often placed in a dilemma. Now, with respect to the nerves : they must either believe them to be organs having spontaneous actions of their own, and therefore setting in motion and regulating all the actions of the body, which is, I believe, the prevailing theory ; or, that they are acted upon first by other powers—in short, they must either be principals or agents. If we consider them as agents only, and not principals, we must necessarily admit that every part of the body, however small, possesses a battery to act upon them ; also, that there is no part where an injury can be inflicted, or a deposition of matter in excess take place, causing undue pressure, but is immediately felt. If this is not done by means of batteries acting upon them, how is it then effected ? We are bound to define their functions, and ought to discover the causes of natural actions, as we endeavour to simulate them in our laboratories. Even in the voluntary and involuntary actions of nerves ; we find the negative power of our will setting batteries into positive actions in the voluntary nerves ; while positive batteries are always in force producing involuntary actions—that is, without our will. Thus, individuals, whether ill or well, when asleep, have twitches and spasmodic actions, and turn over and change positions. Independently of this, their hearts beat and their lungs breathe, and all the acts of vitality, of waste and repair, take place. It cannot be doubted that metamorphosis of structure is always occurring, and that chemical actions ensue, and

heat, more or less, is the result. We are told that even the friction of circulation produces heat; how much more so when the body is in full exercise? We must come, then, to no other conclusion, but that, in the living organism, positive currents are always in force, regulating involuntary movements, while those which act under the will are first stimulated by negative forces, setting positive batteries in action.

I have instanced the simple puncture of a thorn, as setting the little battery of wounded flesh in motion to repair the damage. The temporary destruction of so small a structure causes the instant conversion of some destroyed vital matter into a non-vital one; this is shown by a small fester and the expulsion after a time of the little atom of pus, followed by a perfect restoration of all parts below. In this simple act, we have the germ of many of the phenomena of vitality. We have a wound, decay, death, pain, calorific and electric actions, both positive and negative; injury to nervous batteries, repairing of those batteries, and afterwards the restoration of forces and structures with health of parts. Nay, more; another class of nerves has been powerfully brought into play—namely, the sentient. Our feelings have been hurt; thought and mind have been disturbed, first positively, then negatively; in fact, who could surmise that so trifling a wound had brought together so many powers to restore it, all working in harmony and sympathy? The sympathy of organs seems almost unknown as agents of diagnosis, and, through this fault, organs are often considered diseased which are only sympathetically affected by others, through these nerve forces.

One step further: suppose the wound was not by a

thorn, but by some blunt-pointed instrument, never mind what, call it a dinner-fork or a pitch-fork—anything, in short, that makes a punctured wound. But let us understand what this means, and see how we can ascend a scale of suffering, and even death, emanating from small causes, and be at the same time philosophical and physiological. A puncture through an elastic medium like the skin, destroys given substances beneath, which the skin closes over. The smaller affair had only a thin skin to oppose it, and the tiny pellicle of pus was lodged between the two skins; all this was very superficial. Now, however, a large amount of destroyed matter is formed, and burrows beneath the rete mucosum, all surface vent being shut out. It now lies on fascia and, as it increases, runs along it, and even between muscles. Here we find increased pain, simply because an increased amount of structure is affected, and more batteries brought into play. The popular treatment, both medical and laical, consists in hot poulticing and fomentations. This is in flat contradiction to all well-ascertained facts, namely, where there is excess of caloric, to refrigerate. Why, then, is this violated? When we have gained a fixed point of knowledge, how is it we lose it? By the application of heat, all the laws of caloric and electric actions are increased fifty, nay, a thousand fold; and this is done, it is said, to bring matter to a head. Did people never eat mock-turtle soup? Here, a calf's head is boiled with the skin on; this is cut off when cold and put into the beef-made stock to boil and simmer. The skin, originally an eighth of an inch thick, becomes three-quarters of an inch or more in thickness. This is precisely what is done by hot poult-

tices and fomentations, and thus, instead of bringing the matter to the surface, the area of the injury is increased, as well as the depth of material structure, through which the dead matter is to come away. The presence and pressure of dead matter on nerves greatly aggravates the pain. If, however, the cold refrigerating application be applied, even in the absence of giving vent by an incision, it would keep calorific and electric actions under, and cause a determination of matter to the surface by centralising the forces. But what has happened in the meantime? What gives the sufferer that haggard look, that anxious pallid countenance? Is it pain alone? Can we say to the absorbents and lacteals, 'Stop your actions?' They would answer, 'We have but one duty to perform; everything that comes in our locality which we can take away, we are bound to do, and we respect no matter, be it of a healthy character or be it poison.' In Nature's carpentry we are much indebted to them. What gives rigors in these cases, but the poisons of diseased and dead matter being absorbed into the system. The greatest and quickest known, is pyæmia. Here, then, is an instance of being poisoned by our own secretions, just as clearly as if we had been inoculated with a foreign poison. Sympathy on the one hand, and the action of the absorbents on the other, will produce another evil. If this class of wound is in the hand or fingers, the nearest large set of glands become seats of disease, and abscesses will form under the arm. If the feet and toes are thus injured, an abscess may appear in the groin. On the other hand, excess of elements in the natural batteries under the surface may generate a boil or an abscess. Again those dreadful hot poultices

and fomentations are applied. But we have in these natural instances a different law, to which I would call serious attention. In the punctured wound, there is always a determination from the surfaces to the centres; in the boils, &c., we have the reverse, or a determination from the centres to the surfaces. A boil, if let alone, is 'a nine days' wonder,' for nine or ten days is its law. It indicates an excess of voltaic power in that part where it shows itself, and a desire to disintegrate the structure and throw off the superfluous material. The first day or two it shows a festering head under the two skins, which may be relieved of its tension by letting out the matter, but *no more*; for nature is working beneath to throw to the surface the disintegrated and surplus material. In either case let it alone, or apply cold to lessen the caloric and electric actions. If heat is applied, its whole character is altered and a simple boil is converted into an abscess, and greater destruction of parts ensues, causing greater pain, besides lasting longer. If you lance, or what is called 'open,' a boil or abscess before there is a proper gravitation to the surface, or the skin just upon the point of bursting of its own accord, you cut through a highly inflamed structure, and a lipped or gaping wound is the result—often difficult to heal. This is frequently seen in the necks of fair-haired children, who have been doubly unfortunate in having an abscess in the neck after scarlet fever, and a doctor too free with his lancet; and so they become disfigured for life. Here, then, we find an illustration of two acts in nature. To make a punctured wound—an incised one—and get a gravitation from the centres to the surfaces is the great object, and in both, to lessen the action of the

electric batteries. There is a phenomenon worth noticing here, and that is, the mental anguish that seems in some cases to exceed the actual pain in the parts wounded; while in others, the pain in the parts is in excess of the mental suffering. When the former fact obtains, the positive action is greater from the nerve batteries of the part to the brain, and THERE is the greater impingement of the current; while in the latter, the negative action is greater from the brain to the nerve-batteries. The bearings of these facts in disease, present some of the most important phenomena the physician can study; and illustrate the laws of sympathy in diseases of organs, from a plus or negative action of nerve-batteries, leading to a more defined method of diagnosis and treatment. In the many aspects of disease, we find many analogies to the points touched upon here:—

First. By Sympathy; leading us away from causes to their effects.

Secondly. Prescribing remedies for these effects, supposing them to be the seats of disease, thereby increasing disease as a matter of course; as symptoms do not yield when the *causes* are left untouched.

Thirdly. That Nature herself has always a tendency to throw or determine morbid elements into the great alimentary cavities, or out of the system through the skin: both actions are somewhat similar—namely, from the centres to the surfaces. This is the great ruling cause of all skin eruptions, which always come from overcharged batteries and plus of power, as shown by boils, abscesses, &c.

For several seasons I remember I had many patients who came to me saying, they had been told their

ailments were from '*suppressed gout*!' This I traced to high authorities. What did it mean? Was it that Nature had changed her laws to oblige a theory? My inference was, that as nothing could be made of the case, '*suppressed gout*' became the order of the day. I don't hear so much of it now; it has no doubt gone out of fashion.

May 24, 1865.

LETTER IV.

SIR,—While on the subject of the sympathy of the nerves; which must be understood at all times to mean the action of the vital batteries, producing positive electric currents through them, and wherever those currents impinge, negative ones being returned. Any arrest or departure from this, shows some diseased or abnormal condition. I therefore again draw your attention to the voluntary and involuntary phenomena of the nervous system. Whatever is under the will, is under the mind; and whenever the mind is used and thought exercised, the cerebrum, and more particularly its anterior part, is the source of all its emanations. I believe it is accorded that the cerebellum is devoid of any reasoning faculty. Now, man has a will or control over his colon, and is often obliged to exercise it to suppress actions of that organ, which he would otherwise find most inconvenient. Animals do not possess this power, though our domestic animals are trained to it, inasmuch as they have little or no cerebrum, but perform their natural acts at any time or place, whenever

Nature dictates. If man possesses this power over one of the organs and functions of his body, those two parts must be admitted to have a distinct sympathy, one for the other, and one over the other. Here, then, I will show how a negative force, exercised by the mind, can both arrest or cause a positive action on the nerve batteries of the colon. The first is by a control over its actions; the second by an excitement of the positive powers of its batteries. A craven has a sudden fright, great fear comes over him, and he fills his trousers, most unpleasantly, before he has time to unbutton. Now, I doubt whether any one can deny but that this is a very positive action of the nerve-batteries of the colon, or that they were influenced by the cerebral stimulus. If, then, the cerebrum has so great a sympathy over the colon, we cannot be wrong in inferring that the colon in return can exercise an influence over the cerebrum. In many acts of this most wonderful and ill-understood organ, the colon, I shall have abundance of facts for future illustration. The craven, through fright, having emptied his colon, and that organ no longer supplying a vital element to the brain, the brain, or nervous centre, communicates various negative actions to different parts. It influences the nerve batteries of speech; lessens those of the limbs, which tremble under him; checks those of the heart; and again excites it to inordinate actions; palpitations ensue, besides many other acts which every one knows fear will produce. Again, many disturbances of the colon affect the cerebrum, especially that part where phrenologists have placed the more reasoning powers, viz., the fore part of the head. Thus, costiveness will cause a headache in that part, and much

diarrhœa will distress the mind. A person with hæmorrhoids can never be said to cease thinking of those troublesome affairs; the pain of them impinges upon the sensorium as much, or even more, at times, than in their locality itself. As I have previously said, the positive action here is often greater than the negative one. If we admit this fact; we must come to the conclusion that all those actions and functions which are under the will, have distinct sympathies for and between each other, both positively and negatively. Now, Sir, have we a will or control over the stomach? Can we do the same with that, as we do with the colon? If anything is taken into the stomach; no will of ours can either hasten or arrest action there. We cannot, therefore, trace any sympathy between the cerebrum and the stomach, or *vice versâ*. This is most important in the diagnosis of disease, and shows that no stomach action, normal or abnormal, can affect the cerebrum; and no act or affection of the cerebrum can influence any condition or act, normal or abnormal, of the stomach. Considering the stomach as an instinctive animal or sensual organ, it influences and is influenced alone by the cerebellum as the instinctive animal or sensual brain. Here, then, are two distinct organs, the colon and the stomach, having as distinct sympathies with the two different parts of the brain; the one, with the thinking and reflecting, and the other, with the sensual.

Though I have noticed these facts a thousand times, I never saw them more distinctly or more beautifully exemplified than within the last two days, in a case of paralysis, with its attendant affections, in a gentleman who was seized last January, and with whom the mer-

curials and purges have almost done their work of destruction. I hope, Sir, you will not forget this, for at a future time, when I speak of the wonders of the colon, its affections and sympathies, you will see how pernicious are many of our present practices in the treatment of disease.

May 31, 1865.

LETTER V.

SIR,—As a correct diagnosis of disease so much depends on the basis of a sound knowledge of the nervous sympathies, I feel I must continue this subject. In my last letter I spoke of the sympathies between the colon and the reflecting brain, and between the stomach and the sensual brain—the one under our control or will to a given extent, the other the reverse. Now, besides the stomach, there are the continuous organs, forming what are called the chylipoietic viscera; the duodenum, the second stomach, for it is neither more nor less than this, as I shall have an opportunity of explaining; the liver, the spleen, and the small intestines, not one of which can we in any way influence or control by our will. Nor does any action of the cerebrum directly sympathise with them or they with the cerebrum. Now, this opens up a subject of the greatest importance to all who profess medicine in their capacity of physicians or administrators of drugs, nice or nauseous; the latter often predominating, as I remarked in my first letter, by the stomach proclaiming, ‘I am the first to be nauseated.’ Amongst all the category of diseases, how many have

we ever found attributed to the duodenum? They may be counted on the fingers of one hand. But when we approach the liver, ten thousand diseases, sympathies, causes, and effects, are laid to the shortcomings of this terrible organ. If we are to be logical in our deductions and treat all the chylo-poietic viscera as merely animal or sensual organs, engaged to receive every variety of solids and fluids which the cerebrum in the first place dictates, we are bound to show as far as we can, what powers affect them and what sympathies are induced. I can come to no other conclusion, but that when they are once swallowed they have only sympathies with the cerebellum, and *vice versâ*. Here, then, is a large field for thought and investigation. The cerebrum selects all such viands which it prefers or considers most gratifying to the sensual organs and directs them to the stomach, where, when once entered, it has nothing more to do with them. On the contrary, the taste, the sight, the hearing, the smelling, and the touching have all, with all their duties and nervous connections, sympathies with the reflecting portions of the cerebrum; and here ends the delicious taste of all we eat and drink, of all we see, or touch, or hear, or smell; the dainty viands and the delicious wines, the soft feeling of any substance by the finger, or the lips, or any other approximation. The harmony of sweet sounds, ravishing the sensorium, the smell of odours and perfumed atmospheres, all impinge upon the reflecting sensorium. Again, reversing all these, where everything that is loathsome in smelling, hearing, tasting, feeling and seeing, the sympathies at once declare themselves in but one direction. What has the stomach, duodenum,

liver, and all the chylo-poietic viscera to do with the sensorium? When so many small complaints, affections, and diseases are now attributed to the liver; dimness of sight, *muscæ volitantes*, frontal headaches, loss of appetite, vitiated secretions, and, as I said before, ten thousand smaller ailments that affect the eyes, the ears, the nose, and the taste, are all set down to some fault in the liver. No, Sir, these fables have reigned already too long; let us at once strike deep and with a lusty arm against their visionary powers.

That which we have no control over in the great chylo-poietic system, can have no sympathies with the cerebrum. They are, in fact, all sensual sympathies, and impinge alone on the sensual brain or cerebellum—their positive actions in all their duties impinging alone there, and their negative actions being only from thence returned. What, cries my critic, when we have pain in any one of these organs? Is not that an act by your own showing of the cerebrum? That is quite a different matter, and has nothing to do with the *functions* and *duties* of these parts. A pain in any one of them, or a disease there, is made apparent only through the mental appreciation which informs it of any wrong. The duties and functions of some of the chylo-poietic viscera have their sympathies alone with the cerebellum and the cerebellum with them. I therefore include in these, the stomach, the duodenum, the liver, the spleen, and the pancreas. The small intestines, however, approach another stage, and, no doubt, alter the character of the elements they receive, as they are here influenced by fresh exhalants and secretions. Here, then, some other important sympathetic action takes place, especially as they ap-

proach the ileum. No physiologist, I presume, will question the vast change which ensues between the foreign ingesta taken and acted upon by the stomach, the duodenum, and liver, and what may take place in the small intestines and again in the ileum; and as we approach the colon, the fluid aliments having been absorbed, the solid ones are so soon to become feculent matter. As I have shown the sympathies between the colon and the anterior portion of the cerebrum, and between the chylo-poietic viscera, stomach and duodenum, and the cerebellum, there naturally comes an intervening part between these two. I have, therefore, traced distinct sympathies between the small intestines and ileum to those parts of the cerebrum which are included more particularly in its parietal portions; and this is well worth noticing by the physician, especially in certain diseases affecting these organs both in age and infancy.

June 7, 1865.

CRITICISMS ON LETTER III.

BY A CORRESPONDENT.

SIR,—I have been highly entertained by the racy and amusing physiological observations of your correspondent. Amongst many truths told with great felicity and clearness, there are some observations in his communication of the 24th ult. that I should like to make a few comments on. I allude to that part of

his paper relating to punctured wounds, and the treatment of suppurating glands. He says:—‘ The popular treatment, both medical and laical, consists in hot poulticing and fomentations.’ He says this treatment is in flat contradiction to all well-ascertained facts—namely, where there is excess of caloric to refrigerate. He asks, ‘ Why is this violated ? ’

With all his ingenuity, he will not be able to alter the practice of either the laity or the profession in this particular, which, notwithstanding his reasoning, is founded on long-established facts. Let us take a horse for an illustration. After a horse has been ridden over fences, he is often stumped; his feet and pasterns are often wounded by the sharp ends of large bushes or thorns left by the woodmen when cutting them down. After such an accident, the horse, on arriving at his stable, has his shoe removed, and the leg put into a pail of hot water; suppuration occurs, and bad effects seldom follow. Let the contrary treatment be pursued: deep-seated inflammation arises, adhesions between parts that ought freely to play one on another, and contractions arise; the horse is rendered unfit for fast work, and reduced in value from perhaps 100*l.* to 20*l.* Let us take lacerated wounds for example. It was, and is now, a common practice for many having the case of union by the first intention, to close these wounds with common sticking-plaster, made sticky by resin, and after to apply cold lotions. The pain that ensues from such treatment is of the most severe character; the circulation of the blood through the smaller vessels in the edges of the wounds is often obliterated, and large destruction of the injured soft parts ensues. But let the contrary treat-

ment be pursued, let lint moistened with warm water be applied to the wounds and covered over with oiled silk, or a dressing of common cerate to assist in suppuration be applied, and the position such that the matter have a free exit, and the difference of the effects of the two methods of treatment is at once so apparent, that no unprejudiced observer could doubt which was the right treatment to be pursued for the future, and his electrical, philosophical, and caloric theories would quickly succumb to the stern logic of facts.

Your correspondent also attributes scars to meddling surgery in scrofulous glands, to the premature opening of them by the surgeon; the scars, or, as he calls them, lipped wounds, do not in the least depend on their being opened, but on the time, and if opened at all, they should be opened *very early*, and for the reason I will presently advance. A scrofulous gland when it begins to suppurate, contains a substance like soft cheese, afterwards a thin ichor, and this cheesy substance like curds and whey. It has considerably softened down long before it adheres to the integument, and before the integument becomes inflamed or spoiled. The method to prevent scars is, then, to make a longitudinal incision before the integuments are spoiled, with a cataract knife, and press out all the softened gland: the sound flesh will then heal up, and nothing be left but a white mark similar to the one left after careful bleeding. If the gland be left to pursue its suppurating course, and, still worse, if poultices or iodine ointment be applied, the gland adheres to the integument, which becomes absorbed and destroyed; and, after healing, the wound becomes puckered, arising from

the loss of substance, and hence the scar, which is no larger whether opened or not.

In conclusion, I must confess myself sceptical to alleged discoveries in physiology. Since the discovery of the circulation of the blood, I must doubt if any real important discovery has been made. Yours, &c.,

A SURGEON.

June 14, 1865.

LETTER VI.

SIR,—Old prejudices and dogmas never yet wanted defenders. New thoughts and new ideas are always an insult to the generation in which they are uttered, because they convict it of ignorance, which it never forgives. ‘A Surgeon’ takes up the cudgels against me. He begins by saying he has ‘been highly entertained by my racy and amusing physiological observations;’ and, in the next paragraph, admits ‘many truths told with great felicity and clearness.’ In the letter he takes objection to, I wished to show the law of a punctured wound, which, by means of increased heat, producing a softening of all the surrounding parts, Nature herself was enabled to get rid of the destroyed structure in the form of pus. For be it remembered, that in all these cases the battery actions of the nerves are increased, and there is always a determination from the surfaces to the centres. I presume the same law obtains in a horse getting stumped occasionally over fences, as it does with the human being. The pail of hot water, which is the only plan ‘A Surgeon’ ever knew, simply from its antiquity and

general usage, is nevertheless one which increases the natural heat and extends the area of inflammation. He, however, contents himself by saying, that when hot water is applied 'suppuration occurs, and bad effects seldom follow.' How long a time, may I ask, would he give the part to suppurate? One would suppose, from the triteness of his writing, a few hours only, and the horse be well the next morning. Had he been more physiological he would have said, 'suppuration, by the constant action of hot water, takes place in a week and the animal gets well;' and so he would without it, and probably much sooner. It so happens that many stud grooms, veterinary surgeons, and gentlemen who take an active interest in their own hunters, have given up the pails of hot water by my recommendation, and substituted cold applications, where there has been much heat or swelling. I am bold enough to say, therefore, that if 'A Surgeon' would try it, he would never do otherwise. His theory is right, however, in one point. All fresh blows, bruises, or contusions, should be *immediately* treated with hot applications; for this reason, the contused vessels are thereby kept relaxed in their calibres. and the integrity of the circulation is promoted and 'adhesions between parts that ought freely to play one on another are prevented.' But, again, a false physiology, both medical and laical, consists in applying cold in all these cases, and thus causing the very thing they wished to prevent. Both men and horses, therefore, that fall or get knocked about should have all such contused parts treated at first with hot water for the reasons above stated. On the other hand, all abscesses, &c., generated within the body, having natural excesses of

caloric, should be treated with cold. Let those who apply cold to contusions, &c., and heat to abscesses, reverse their proceedings, and they will act both philosophically and physiologically right. It is this mistake in these simple matters that makes them wrong.

While on this subject, I will further illustrate it. Whenever, and wherever, or for whatever purpose, the surgeon inserts his knife into the flesh, the electro-vital batteries determine their aura to the centres. Hence, in the old surgical days, before chloroform was thought of, I have often seen the effects of first incisions. The operator would say to his assistant, ‘How is the pulse?’ ‘Very low, Sir.’ ‘Yes, the patient seems much blanched; give him a glass of brandy.’ A pause. ‘Well, how is it now?’ ‘Better, Sir.’ ‘Ah! there is a return of circulation in the face, there is a slight blush; we will now proceed.’ These circumstances were simply noticed as *effects*. No one ever offered a physiological reason for them. I have done so, and I feel I am right, for the following reason:—Internal disease, congestive actions, pressure of tumours, &c., excite the system. In former days the withdrawal of a little blood by the lancet, by cupping, or by leeches, was ordered. When this fell out of fashion; antimonials and digitalis, and the bluepill, succeeded, with the withholding of all excitable stimuli. What was this but what I contend for, that the electro-vital powers were from the centres to the surfaces, and in such force, that this treatment was adopted to check them? But it being afterwards found out, that it was only from temporary excitement, that they arose, it has since been wisely abandoned. In practice, both to the surgeon and physician, this simple phy-

siological fact is of great importance. The same exists now, only chloroform in operations has diminished the electro-vital powers, or rather held them in abeyance. Therefore, whether they are excited from the surfaces to the centres, by surgical operations, sudden falls, wounds, bruises, or contusions; or by internal disease from the centres to the surfaces, these great facts ought to regulate and influence our medical practice.

‘A Surgeon’ next speaks of lacerated wounds. Now, a clean cut with a sharp instrument is one thing: a lacerated wound quite another. What makes a lacerated wound? A fray with poachers or a tussel with policemen, so that bludgeons or staffs do these things very completely—or awkward falls will produce them. Here we have lacerations, *with contusions*, more or less. Is there no difference between these and clean cuts without them? Physiology would say there was. Let us take the first: the clean cut without contusion, however done, the treatment in closing the wound entirely is, I think, very unsound. Suppose the wound to be an inch long, I should place three long strips of plaister, about the eighth of an inch wide, first one across the centre, and the other two a little distance on each side, so that you have three-eighths of an inch for all the purposes required, and five-eighths for vent: thus four openings are left for the exudation of morbid elements. Lint, moistened with cold water, put over this, is sufficient. The lint may be changed as often as necessary, and the surgeon can see all that is going on, and need not remove the strips of plaister until adhesion is complete again. Suppose an incised wound is made, either to extract a tumour or a mammary cancer, and the wound is eight inches long. Take slips

of plaister, twelve to eighteen inches in length, and about half an inch in width, and bring the edges together at three quarters or inch distances, and put a pad of moistened lint over. The wound can then be seen daily, and how exudation takes place, and the plaisters need not be removed till the whole is well. Now, when the whole is shut up with plaister, an inch or two wide, the edge of one piece overlapping another, burrowing of purulent matter occurs.

Now take a lacerated wound, which may or may not be accompanied by a contusion, although it generally is. If no great vessels are injured, a hot fomentation is the very best thing, for the reasons already given, for bruised or contused vessels, while a little extra bleeding does no harm. Superficial bleeding soon stops; then bring those edges together which approximate nearest and best with their opposites, as you would a common incised wound, with narrow slips of plaister. What does 'A Surgeon' want with cerates of oiled silk? It is really evident to me that he does want 'electrical, philosophical, and calorical theories,' to bear on very simple transactions in surgery.

'A Surgeon' next refers to serofulous glands. I find I said nothing about them. I merely alluded to the premature opening of a common abscess of the neck after scarlet fever, caused by simple functional obstruction, entirely independent of all serofulous taint. I have also seen many cases where these glands, when swollen, would never have suppurated, if they had not been excited thereto, by the application of hot poultices and hot fomentations; proceedings which I most heartily condemn as most barbarous, uncalled for, and most unphysiological. When they have been brought to this

state by these means and converted into common abscesses, I then say, they had better be left to gravitate to the surface and burst, or with the slightest assistance by puncture at the most gravitating point, without the interfering knife of the surgeon, to cut through flesh at too early a period, and so make gaping and lipped wounds. This is the very opprobrium of surgery.

‘A Surgeon’ concludes his criticism by saying : ‘ Since the discovery of the circulation of the blood, I must doubt if any real important discovery has been made.’ Did not the discovery of the lacteals, absorbents, and lymphatics follow this? And if not entirely so, most of the physiological uses of those vessels certainly did. Even if ‘A Surgeon’s’ opinion is universally shared, it cannot be from the belief that everything is known. It therefore becomes the duty of the physiologist to find more, and even better uses, for many structures and organs, which the anatomist has long since revealed to us, but of which we are still most ignorant.

If men of the present day will follow a beaten track ; rely on and believe received authority ; quote old authors and old doctrines and theories ; and never observe or think for themselves ; so long will the present state of things continue. Let us emancipate ourselves from this thralldom, which only stands in the way of advancement.

June 21, 1865.

LETTER VII.

SIR,—We cannot speak of the sympathies of one part of the body with another, without being constantly reminded of the electric batteries of the nerves. Nor can we speak of these, unless we have some knowledge of their condition and power ; the means whereby they are set in motion, and how they may be interrupted in many of their most important duties, either from a deficiency or excess of those elements which produce electricity. In my fifth letter, I endeavoured to show the sympathies between the chylo-poietic viscera and the cerebellum, and between the small intestines and the parietal or less reflecting portions of the cerebrum. Indeed, it has often struck me, whether the chylo-poietic viscus, the stomach, and the chylo-poietic viscus, the duodenum, do not entirely finish and conclude the conventional term of chylo-poietic viscera, and that the small intestines have no title to be included with them. For instance, the duties of the two first are limited to chemical actions, few absorbent ones occur in either of these alimentary organs, the stomach or duodenum. The first is the acid, and the second the alkaline alembic. The first, for the conversion of the ingesta into such a homogeneous mass as to fit it for the second ; and the second for the third or small intestines, to be therein acted upon in an entirely different way. Some elements to be there absorbed, to regenerate the fluid constituents of the body, while the solid residue passes into the colon. I do not then see that the jejunum can have any positive sympathies with the cerebellum, but in connection with the ileum sympathises with the posterior portion of the cerebrum.

Now, in injuries of the parietal portions of the head and the brain beneath, I have noticed symptoms affecting the small intestines; and I have equally noticed affections of the small intestines and ileum, to sympathise with the parietal portions of the cerebrum. Here, then, are distinctive sympathies. Let us illustrate them further. In irregular conditions of the uterine functions in the female; no man who has had much practice in these cases, will have failed to observe peculiar sympathies with the vertex of the head, accompanied by a headache in that spot. Here is a part apparently mixed in its action, and it would be almost difficult to say whether the whole of the cerebellum, a sensual structure, or the posterior part of the cerebrum, a partially mental structure, is most sympathised with. Uterine functions have always appeared to me, to be partly sentient and partly instinctive sympathies. These vertex headaches, so frequent in the female, and so rare in the male, would at once show that a sympathy must exist in these parts with the uterus, and *vice versâ*. The happily regular female seldom experiences these headaches; but the unhappily irregular one has them to a great extent; and when they are present, are always attended with a burning heat or excess of caloric. The uterus itself may not exhibit so much pain or discomfort, because the electric current going to the vertex, and there impinging, most assuredly shows by the headache there, that the positive action of the uterine nerve batteries is greater than the negative. Irregular functions of the uterus produce in the system a host of protean maladies, known under the name of hysteria; so that uterine disturbances cause many others in other organs. So central and commanding is this sympathy, that both

cerebrum and cerebellum become affected. Thus, the reflecting or anterior portion of the cerebrum becomes affected by the costive and other morbid conditions of the colon; the small intestines imperfectly acting, because of insufficient diet, and little or no chyle of any consequence passing into them, or when any does pass, healthy absorbent actions do not take place. We find, then, that the pains accrue in the parietal portions of the cerebrum. Loss of appetite, from inability on the one hand, and distaste on the other, forbids the taking of proper nourishment, and therefore the stomach and duodenum enforce their sympathies on the cerebellum. Thus we have all parts of the head affected at one time, from each part's own sympathising centre. If, by proper medication and diet, a better train of electric actions takes place—as, for instance, more being eaten and digested—the cerebellum recovers itself, and headache leaves that part. The absorbent actions of the jejunum become more active and healthy, consequently the parietal pains of the head cease. These two actions greatly influencing the colon, that organ begins to act more regularly, and the frontal headache disappears; and at times, when any better and more regular functional condition of the uterus takes place, then the vertex headache leaves also. All these actions I have noticed thousands of times, and they are as plain to me as I wish, Sir, to make them to you. Here, then, is the story of the sickly girl I spoke of in my second letter; and here we are able to trace many of the sympathies of her functionally deranged system. She has no organic lesion; she simply has a uterus which, from some inexplicable cause, does not perform its proper duties, and from this cause, her whole system is upset. Not only

the chylo-poietic, but absorbent; not only these, but the faecal; not only the faecal, but the very elements by which battery powers are given to nerves; not only these, but the whole tenour of the circulation, and the heart's action as well. Simply because the whole system has all this time been improperly and insufficiently nourished.

This, then, is a fair field for science to investigate. Whether disturbing elements first came from non-nutrition of the uterus itself through other organs; or whether that organ, in its mechanical and physiological duties, was the original *causa mala*.

Its effects, however, become deeper; for we find in these cases, more than any other, that the brain itself becomes affected. As I have only been speaking of the sympathies of distant or bodily organs with parts of the brain; it must be inferred, that these different parts cannot be so constantly affected without other parts of the brain itself becoming implicated. Nor can it; for when it does suffer in itself, its symptoms are shown by a temporal headache in either one or both sides: so that, in diagnosis, whatever the physician may see or hear as to the various affections of the head, he is only to bear in mind a few of the simple sympathies of organs with its various parts, and not to consider the brain has of itself anything to do with the matter, except as recording them. But when temporal headaches are present, they imply that the brain itself is affected. I have never been able to trace any sympathy between the temples, or the headaches that occur there, to any sympathy with other organs, as I have done with other parts of the brain. Many years ago, the vertex headache in the female first prompted me to investigate the

subject. It struck me, as it no doubt would any other observer, that as this was so distinct a uterine sympathy, and as the brain had two distinct parts, the reflecting and the sensual, it appeared to me a fair subject for deeper investigation; believing, as I do, that what influences the reflecting part could not influence the sensual; and what belonged to the sensual, could not influence the reflecting. And it did also appear to me that we were often at sea with many complaints of our patients; that we were led to guess too much, and to infer too much, and, as a consequence, to become too empirical. For whereas, in any given case coming before us for medical relief, some men would lay the whole train of symptoms, and what they could find out or make of them, to a derangement of one part; while others of equal standing and ability in the profession, would hold a diametrically opposite opinion. Now, as both could not be right; it seems just as clear, that both might be wrong, as one right and the other wrong. It is the object of these letters to open up a new train of thought, and bring about more fixed rules for estimating disease, and ultimately a greater unanimity of opinion, with more certain and more scientific results.

June 28, 1865.

LETTER VIII.

SIR,—I wish to add a few more observations to my last letter on brain sympathies, as physiologists have always considered the brain so important an organ, and been amazed at its varied character and immense influence, both mentally and instinctively over the whole

body. This, however, is only one side of the question. I have endeavoured, on the other hand, to show how much influence many organs of the body exercise over the brain—that is, how much and how singularly different parts of the brain sympathise with different parts of the body. These facts being admitted; there is a third that is worthy of consideration. It would not be at all consonant with man's exalted position, possessing, as he does, the highest mental attributes, if Nature had not protected the brain above all other parts of the body. Man would not be what he is, if it were not for the greater development of his brain beyond all other creatures. Nor could he maintain that pre-eminence, if the brain itself were subject to the constant disturbances to which other organs are liable. While, then, all other organs suffer functional disturbance, in a far greater ratio than the brain, man is still able to carry on the duties of life; and at the same time bear with his ailments, and he does so, because the brain is unaffected in itself, although constantly sympathising with the parts affected. There is, however, a time when the brain itself becomes functionally disturbed. Persons who have constant ill-health, are debarred from following occupations which demand physical exertion, though their mental powers may be of a high and also a healthy standard. Yet, if my propositions are correct, in regard to the sympathies the brain has with other organs or their functions, which exhibit these said bodily ailments, it must happen that the constant sympathies with other organs will eventually affect the brain structure. What, then, takes place? What are the indications of the brain itself being affected? If we are to consider the various headaches already de-

scribed as only sympathies ; where are we to look for a positive sympathy of the brain itself ? This question I will proceed to answer. When the brain structure or its membranes become diseased, it is made apparent by a headache in one or both temples. Before this takes place, premonitory symptoms of vertigo, loss of memory, or a general want of what may be called brain power, or a number of other affections of the mind, occur. If we were to infer that every affection of the brain was a *bonâ fide* brain attack ; then there would be an end to all sympathetic actions, and the faculty would be, as probably many are now, led astray by them. But if they would carefully watch the sympathies which I have described, and observe how they disappear with their causes, they would at once see, that it is only when erratic mental affections and disordered brain structures are coupled with temporal headaches, that active causes exist in the brain itself. It cannot be supposed that all the sympathetic actions I have spoken of can go on so frequently and not leave some prejudicial influence on the organ impinged upon. Besides this, we must take into consideration the state of the general secretions, which long trains of causes and disorders have most materially affected ; and, consequently, imperfect or excessive nourishment must influence the nerve-matter of the brain in some way. The anæmic hysterical girl I have spoken of, offers a wonderful illustration of this ; every bodily organ having sympathised with the various parts of the brain ; and lastly, the brain itself becoming affected, gives rise to a thousand fancies, while all its powers are perverted or disturbed. Take another case : the young Cyprian, devoting his nights to debauchery and every sensual

indulgence, will have all the headaches combined and the brain itself functionally disturbed. If he is wise in time no great harm is done; but carry the case further, and see him in delirium tremens; watch him, observe the steps to this fearful disease, and then notice the sympathies I have laid down, and all that I have written will be found true.

In speaking of the sympathies, my object must always be considered in relation to disease, and those symptoms whereby we are enabled to detect its presence; so that we may not mistake a symptom occurring in any locality as incident to disease there, but to endeavour to elucidate more clearly, between a mere symptom or sympathy, and the true cause which produced it. Thus, then, there are organs with which the brain does not sympathise. For instance, the heart and the lungs: the one, the great organ of the circulation of the blood, and responsible, as it were, for its own acts; there being no brain sympathy that can in any way lead the physiologist or the physician to detect disturbance or disease in the heart, as is the case in other organs which I have pointed out. The same with the lungs; their duties are also distinct, and have no direct brain sympathies.

In all affections of both the heart and lungs, some alimentary disturbances are sure to exist; for this reason, if, in heart or lung affections, the physician finds sundry brain disturbances, it is through other organs—not them. The sympathies we might naturally look for here are between these two organs themselves; because they are so intimately connected with each other's movements. Again, with the whole glandular system, there is no brain sympathy. These organs

have sympathies with far different elementary substances of the body, such as the fat, the fasciæ, and muscles. The liver I do not consider a gland; this may startle my readers, but I will illustrate my objections to its being classed with the glands, or being called a gland, when I speak hereafter of its duties. Physiologists, from time immemorial, have commenced their description of this viscus by representing it as the largest gland in the body, which I now deny. Being completely outside, and having nothing but a mechanical connection with the duodenum, it does not even influence this organ in any way. If it did, why not say the same of the pancreas, which has just as much to do with the duodenum as the liver? The sympathies of the liver, therefore, are few, and confined to the organs more immediately within its contact and with which it has most to do. Then as to the kidneys; are they glands? I deny their right to be called so. Their duties are different to all other so-called glands, and if they did what physiologists now say they do, no animal could exist very long. But as I am now only speaking of their sympathies with the brain; they, like the true glands, in some respect, sympathise with regions of fat and fasciæ. The bladder, again, has no sympathy with the brain; but being so closely allied to the genital organs, these have very great sympathies, both with the cerebellum and cerebrum. The former as the sensual and animal brain, and consequently, strong in all animals below man, and as having no reason in their acts. While in man they are influenced, on the one hand, by passions originating in the cerebellum, but under the control of his reasoning powers, through the reflecting portions of the cerebrum. Hence, there

is a combination of electro-vital powers between the two; for we know, when the sensual passions of man are not under the control of his reason, they overcome it, the mind being often sadly and irretrievably ruined by abuse of the sexual passions in both sexes. So that, while the genital organs of both sexes have a great analogy between them in many important respects, they have also analogous sympathies with the brain. The uterus, however, of the female, as a matrix or depository of the germ of reproduction, stands in an entirely different category to the actual genital system and its actions. I have, for that reason, placed it and its sympathies elsewhere, and of which my readers will see the justice. These theories, Sir, which I propound are no 'fancies' of mine. When once impressions have been made on me I have noted them, watched them, studied them; I have been chary, very chary, in jumping to any conclusions. I found the difficulty of isolating trains of suffering and symptoms which appeared to me like sands on the sea-shore. It has only been by carefully examining every individual case, from the most simple to the most complex, that I have been at all able to bring facts out of chaos and confusion.

The brain, then, is seen to receive a vast number of sympathies, and yet remain unaffected. Again, it is seen that these cannot continue for ever, without ultimately leaving some impression upon it.

As all these matters have been of great assistance to myself in the diagnosis of disease, I have introduced them to your notice, in order to show what are only sympathies, as contra-distinguished from actual dis-

order of brain structure. The difference is wide; but to be able to discriminate between them, will be found as physiological, as, I trust, useful in a scientific point of view.

July 5, 1865.

LETTER IX.

SIR,—Physiology is so intricate a subject, and one point so constantly running into another, that it is difficult to select which to take up first. I commenced on certain sympathies and electro-vital phenomena as introducing the subject to your notice, but have by no means exhausted them. The first impression produced on the mind of the physiologist, leads him to ask a thousand questions on the principles and laws of life; over which every organ and every function of those organs, have more or less influence. Their regularity in every particular, produces health with life; their irregularity, life without health: while a cessation of their duties causes death. The second of these propositions has called into existence the healing art, and those who profess it. Anatomy being the foundation stone of the physician's studies; physiology naturally becomes the second. The one, a mere mechanical industry, compared to the great mental problem of the other. We see the body in health performing physical acts of wondrous power and endurance. We find it in its mental duties almost superhuman. We view it daily to a large extent as a self-supporting world in itself; and all we know of its constant waste and reconstruction, though considerable, is yet far short of

what science demands. What is the blood? Are we, for one moment, to believe all we read about it, and what is taught of it in the schools? We cannot do so. Yet what we know of this and on all other matters, we have made the basis of great principles, in attempting to alleviate the sufferings of our fellow-creatures; but, alas, how often do the very best and wisest of us fail! How is it that we do not know how or why the sick are restored to health; how or why we fail to bring this advantage about; or how and why, with all our dogmas and systems, our patients die? It is simply this: because there is so much we do not know. This is the great stumbling-block in our way. Are we to believe all secretions are made from the blood? Certainly not. There are many pints of secretions and lubricating fluids in the body which are made within it—used by it—and become exhausted every day of our lives; which never came out of the blood and never go into it. What do we know of those mighty diluents that are so absolutely necessary to the life, health, and comfort of the body? Is it possible even to conceive, that organs such as glands, destined to secrete elements to be used again, can so far do this, without having their precious stores, which are so concentrated and filled with elements of life, or even that they could fulfil their destined objects, without being largely diluted? Where, then, are these diluents to come from; where do they meet their principals, and how do they get mixed before they perform the duties marked out for them? How, again, do we resist the pressure of the atmosphere upon our bodies; or how can we absorb so much oxygen into our systems; swallowing it with every mouthful of diet or drink, in such vast quan-

tities, unless we had elements within us immediately prepared to neutralise it? The mere act of our breathing oxygen is nothing compared to that which we swallow and absorb. The old and stubborn contests that were once carried on by the solidists against the humouralists, with an equal amount of acrimony and ignorance, show to us but a small amount of either philosophy or physiology. In this our time, we can afford to look back with some pity at their actual quarrels, and can, in a scientific vein, ask, where were all the gases? They were never taken into consideration. Can anyone deny we can exist without them? There is no greater question in physiology than this:—Where do we get our gases? Where are they generated? What are they? What influence do they exercise in the animal body? What are their uses? While living we seem to have no thought of them. When dead,—Bah! What a dreadful presence they become! Let us put the body out of sight, for the whole mass is turning into gas! Gas the most poisonous; every solid seeking fluid solution, and every fluid a gaseous one, till all is consumed, and a simple pint measure would, in years to come, contain all that is left of that wonderful organism; a living man in all the pride of health and strength. The living or vital spark, that wondrous agent which kept every solid, fluid, and gas together by wise and unerring laws; in all their changes and transformations, each in its place, yet all for ever amalgamating; had fled and left only what I have recorded. Let us think for a moment; let us give this one passing thought. Did not these very same gases have a great, a marvellous, and a most predominating cause in making him what he was?

Has physiology yet touched upon this point in the way which it ought to have done ; and is there not here a great field to discover what we do not at present know or even dream of ? To treat the body in our office as physicians upon what we know, we may do much ; we lay the flattering unction to our souls that we do accomplish much ; but how much more may we not do, with greater knowledge in fields where the foot of man has not yet trodden ? We have only skimmed the surface. The duty of the present age is to search the depths for fresh pearls, for fresh minerals, for fresh knowledge of the hidden treasures which must be in store for all who seek them. These are not found in the ring fences of received authority, which only warp and contract the mind of the enquirer. These bounds must be overleapt. What do we know of the stomach and its first lieutenant, the duodenum ? What of the jejunum or small intestines ? What of the colon or large ones ; and what of their peristaltic actions ?—an imaginary phrase for explaining what we do not exactly understand. All we know appears but very superficial. What do we know of the kidneys ? When our physiologists teach us that all the urine they secrete comes from the blood, never was it so happily ignorant as when it relies on such a figment of fallacy. Even the fat shares a common opprobrium to a physiological knowledge, and though performing duties of boundless use with wonderful precision and order, we pass it by and say, it is fat, mere fat, and we think only of Christmas cattle-shows and proverbially fat aldermen. What do we know yet of those wonderful actions in the system of exosmose and endosmose, by whose means the most wonderful duties of life are carried

on; and why there is no such thing as open vessels anywhere in the body; all its actions being carried on through the porosity of the whole living organs and structure, individually and collectively? Truly, Sir, there is much to be done yet, before we can understand many things, and why so many things are still hidden from our view, but which we always have before us, awaiting only enquiry and research. The great difficulty is where to begin; for there is not a point we can touch upon, but brings another immediately in contact to be explained with it. As far, then, as I am able to disentangle this great mass of matter, I will endeavour to do so. If I should often mix my subjects, it will be because I have no power to unravel any single thread without breaking it off occasionally and re-joining it; yet I hope to bring many important things before you for your consideration.

July 12, 1865.

LETTER X.

SIR,—The object of these letters is not to make you the medium for receiving a work on physiology in weekly parts, but to record the observations of thirty years' diligence in my profession. This will save all misconception. Anatomists have, by the rarest diligence, discovered the exact position of all organs, as well as the vessels going to them, whether arteries, veins, absorbents, lymphatics, or lacteals; and have given the normal course of all the nerves, whether motor or sentient; with a general construction of the whole frame, and many other matters incumbent on all to

know. The physiologist, on the other hand, has endeavoured to find out the duties and functions of all these wondrous parts which his brother, the anatomist, has laid before him; so that, starting from this point, I have to record my doubts on many of these physiological points on the one hand, and to express my own ideas of them on the other; feeling that I have a just right to broach new thoughts on any topic, and even to disbelieve as much as I like of what is said or written; leaving the same thing open to others to doubt or disbelieve whatever I may say.

Let us, then, begin with the blood, and ask what is its true use in the body? Physiologists say it is the great supporter of life, and all or almost all secretions are made from it. This I am inclined to think a great fallacy; because upon consideration I cannot see how it can do anything of the kind. It appears to me to stand in the same relation to the fluids, as the skeleton does to the solids. It is one of the grand supporters of power and a nourisher of the organs themselves, for without it, they would fail partly or entirely. We see this in anæmic patients, and in those who have suffered large losses by hæmorrhage from any cause whatever. Therefore it is, that the blood is recognised as a great power in the body; but we have just as good grounds for saying that all muscular and such like soft solid structures are derived from the bones, as that all secretions or fluids are derived from the blood. It seems impossible to believe that the immense amount of fluid elements which the body contains can all come from the blood. If we have a severe cut, many small blood-vessels are divided; but are not veins, lymphatics, absorbents, and

lacteals cut through also? Is not muscle, fascia, and skin divided, and do not the secretions from all these sources help to swell the quantity of fluid lost? Can any one say it is all and entirely *bonâ fide* blood? I think not. Is not, for instance, the bleb of a burn or a blister, large as it is sometimes, made so from the gravitating fluids beneath the skin; and by its own laws drawing fluid particles from all surrounding parts? Are these fluids derivatives of the blood? We see they are not. If we trace the arteries to given organs, such as the glands; surely we cannot believe for a moment that all the secretions from these organs are made from the blood sent to them. If it were so, an ingenious mathematician might calculate the amount of blood required for each gland; how much of its elements were taken away to make so many pounds of saliva, and then how much was carried off by the veins, of what was not wanted for the first purpose. The secretion of the gland would then be found so great, in proportion to the blood sent to it through the arteries, and what the veins carried off as excess; that he would come at once to the conclusion, that the gland had some power of its own, somehow or somewhere, to enable it to secrete and excrete in such quantities. The next thought would be, that, probably, the true use of the blood was to keep the gland structure itself in its integrity, as an organ under constant waste, and requiring immense repair; and it would then be found that the blood had quite enough to do in accomplishing that most important object. Later physiological discoveries as to the periosteum illustrate the fact, that if periosteum be so transposed in parts where bone is not required, that bone would never-

theless be its product. This shows that the periosteum is nourished and sustained by the blood, only for that organic structure to fulfil its own peculiar duty of forming bony matter. It therefore got its own support as an organ from the blood, but derived and made its structure by its own resources and from the preserve round about it of other elements. Blood, again, traversing through bony structure, seeks only deeper-seated tissues, in order to nourish them, such as the inner membranes, which, in their turn, secrete the marrow, synovia, &c., in the same way. Even in the damages to various parts of the body from accidents, it is not to the blood alone that we must look entirely for repair; but to other resources and other fluids, no doubt equally valuable in products and properties, to effect the given end; and therefore I say, that it is not to the blood alone we ought to refer all regenerative acts. When there is excess of forces in these damaged parts, we have excess in the healing processes, and the physician regulates this by diet or medicine; when there are deficient forces, he endeavours to supply that deficiency. If, however, he depends on diminishing blood power alone on the one hand, or on the blood products alone on the other, he is wonderfully deceived, and meets with those disappointments which he cannot account for. He wants to decrease power in one case and to increase it in the other; but does not know exactly where to get it. He tries to do it through the blood elements, and fails to find these alone sufficient for his purpose; simply because he believes in a fable. The balance of blood in the body is kept up through its two great streams, the arteries and the veins; yet only a small portion,

in comparison to the whole arterial current, is exhausted at each pulsation of the heart, as there is always the greater mass present. That which is sufficient for all renewal of structure is taken; the residue is carried into other channels, namely the veins. Let us, then, observe how exhaustion of blood takes place in its first stream, the arterial. There is not an organ or part to which it goes but is renewed by it. It is through this blood to a great extent that all the structures themselves are kept up. Is not a gland different to muscle, muscle to bone, bone to cartilage, cartilage to nails, and so on through every part? Arterial blood, then, is the great reviver of structure; but even here I do not admit that it is so entirely. The gases made in the body must help even this, and so do the fluid elements which are independent of the blood. Nevertheless, here we see quite enough for the blood to do, when we find a certain exhaustion of it in this process. Let us confine our thoughts entirely to structure. Do not let us now consider what that structure does, whether it comes under the name of organs which secrete a product to be used again in the animal economy, or another to be got rid of, either as an excrement, or a thing that, if it remained in the living organism, would be injurious to it. Let us, then, suppose that arterial blood makes and upholds structure alone, under whatever designation. It traverses everywhere, and its elements being so numerous and inscrutable, there exists a power to make muscle, a power to make its fascia, a power to make cartilage, bone, sinew—in fact, every distinct thing, organ, or structure, or whatever the anatomist's scalpel has traced and called by a different

name; because of its being a different body with a different character. I say, then, that the arterial blood, if we look at its character and quantity, has quite enough to do to make and uphold structures of such variety and bulk without having much to do with the secretions of organs. We see an evident exhaustion in the capillaries, but what else do we witness? Why, that a large mass, after passing through the capillaries, gradually enlarges into even greater streams called veins. Take a pound of arterial blood by weight, how much can we calculate has been abstracted from that by the system, and how much venous blood is left? If we had not a very large balance of this, what would be the use of the veins? According to the present opinion of the uses of the arterial blood, at least two-thirds would be exhausted in its flow. Then where should we get the venous blood? We are, at all events, on the horns of a dilemma; we become fixed if we cannot account for the large venous circulation, and I do not see how we are to get out of the difficulty, unless we give up the duty of the arterial blood as an element from which all secretions are made, and remain satisfied that the call upon it would be too great for structural purposes and the formation of secretions as well. If we only take the former, we can account for the large residual mass. Now, let us look after this for argument's sake, for a balance must be kept up. What is the venous blood? I answer, It is a very large residual mass, having once formed part of the arterial. But what becomes of it, and what are its duties? It is not considered an organic element like the arterial, yet it contains precious and vital elements. It is evidently so necessary

to the system, that without it, that system would soon perish; therefore, it at once shows itself to be a sustaining power, and must act in the body, both as a reservoir and a diluent, as it evidently furnishes a large portion of the next made arterial blood. But all the venous blood from the abdominal organs goes into the liver to form bile. Arterial blood may, then, be considered to all intents and purposes an organic element, and in such light physiology has justly placed it. But venous blood cannot be so considered; neither can bile, from which it is made, though it is a useful chemical element. It is patent, then, that a large quantity of venous blood from the general circulation, and some residue from the portal blood, again much reduced in its elements, finds its way to the vena cava. It is only the venous blood of the upper and lower extremities which comes again into the circulation not robbed of any of its elements. It is evident that the large proportion going to the liver, amounting to half, or nearly so, of all the venous blood in the body, would be an immense loss to the system if the mass was not made up by other sources. Here, then, is a point in physiology in which we are obliged to break a link, to re-join it at another time, in order to speak of the uses of other organs and other supplies, whose influences are very large and elaborate.

July 19, 1865.

LETTER XI.

SIR,—In my last I spoke of the liver as an organ which withdrew and consumed a large amount of the venous blood from the general circulation. I also spoke of the arterial blood as a supporter of structure, and a maker of the organic but not of the inorganic secretions. If I wanted to give a greater proof of this, I should instance the liver itself. The physiologist will at once see, that the arterial blood alone supports structure there, for when it has done this great duty, its residual mass enters into the portal system, the same as from all the other abdominal viscera, for the formation of bile. What, then, can other arterial blood, sent to other organs, have more or less to do? Chemical physiologists have long since convicted themselves of wrong, because they have discovered in the secretions of organs elements that do not exist in the blood; and, on the other hand, say organs make their secretions from it, and yet do not say where the elements which they find come from; when they do not arise from the blood itself. Now, bile and urea are both elements of the blood, and are necessary to it, but it is the excess of each which would be prejudicial to the general economy if they continued there; therefore, a portion of one, the bile, is removed to answer another purpose; while a portion of the other, the urea, is taken away entirely; the bile being taken from the venous, and the urea from the arterial current. Take a third organ, the spleen, which acts differently to both. What secretion presents itself there? None that we are aware of. The spleen evidently does not secrete, but it nevertheless changes the

character of the blood, however slightly, in some way. Physiologists call it a reservoir to assist the duties the stomach is called upon to perform; and there is, no doubt, great truth in this; but it does this through its arterial current; while with fewer capillaries it yields richer elements to the venous circulation than any other abdominal organ, and consequently we have a just right to believe, is richer in bile than any other residual blood. It is, then, the combination of all these masses of residual blood which are rich in elements of bile, that the liver has to work upon.

Physiologists have always been of opinion, that the arterial blood does not impart its regenerative powers, except through its capillaries. We ought, if we admit the general osmotic action of all structures, to doubt this, and further, that in the transmission of arterial blood through the great trunks, that the arteries themselves, by exosmosis through their coats, supply regenerative elements wherever they go, and do not allow the system to depend on the capillaries alone. Yet it is affirmed by the first authorities, that it is only through certain porous parts of these vessels, that regenerative elements can exude for that purpose. Are we, then, to believe that until the arterial blood itself is altered in character, as it must be in the capillaries, it is not fit for the duties we have always attributed to it? These vessels, to do what has been said of them, should be analogous to the cellular structure, and seen everywhere in perfect networks. But they are most visible and more numerous at terminal points, and if we use the term 'capillary' in every sense alike, we shall find that they are quite as much mechanical aids as actual regenerative vessels. We shall find them the heart's

faithful adjutants; that they assist the systolic actions by suction, so that while one organ is pushing, as it were, an element at one end, another is pulling or attracting it at the other, making the efforts of both fall much lighter. If this is the case, I do not see how one can do without the other. Another simile would be that of a propelling force at one end and a vacuum at the other, for we all know the action of a vacuum and the power produced thereby. I cannot, therefore, entirely admit that the arterial current is only distributed through the bounty and goodness of the capillary system. If I did, I must deny to the arteries the common duty of all porous substances, and say there is neither endosmose or exosmose through them or the veins either, but give to the capillaries alone these high functions. As there can be no such anomalous distinction between vessels, such as the arteries, veins or capillaries; physiology must give to all of them analogous functions as regards all osmotic actions. Let us view the arterial circulation of the brain; the vast network of these vessels, and the manner in which Nature conducts the residual blood through its bony cavities and tortuous canals; stopping direct or excessive currents, and compare them with the large venous trunks, *without valves*, for the sake of a greater rapidity in bringing back the residuary store. We surely cannot assert, within the small space that all these occupy, that it is to the exosmose of the capillaries alone, that the true and only virtue of the nourishment of the brain is due. Knowing this, we have a right to ask, if we do not take too limited a view of the blood circulation; whether or not in its current, it does not both impart and absorb elements all along its coats, and that

these elements contain much gaseous and electric antra. It is very evident that all porous structures both absorb and exhale. There can be no doubt, that those who take great physical exercise, exhaust a larger proportion of fluid elements as well as gaseous ones, and that great muscular action compresses and acts upon all vessels through which they pass, and compels them to furnish their supplies quicker; while those who do not take much exercise have means of storing the fluids by simple cohesion of particles, known under the name of fat. Great tonicity is observed in the former; and great laxity in the latter. Hence, in hot weather, or under the same amount of exertion, the fat man exudes or perspires more than the thin or wiry one. I am free to think, then, that the capillary structure is not entirely that, whereby regenerative acts are alone carried out; but that it is as useful *per se* to furnish regenerative acts at the part where it impinges in the arterial circulation; but that the richer supply to the system comes from the latter. It is very evident that the arterial, capillary, and venous circulation have their own distinct duties to perform. Under the present belief, we would say, that the arterial blood itself is not an element for regenerative acts, until it comes to the capillary structure. Although many very valuable experiments have been made, and many minds have come to this conclusion; yet I do not think any physiologist can entirely affirm them. A certain faith in dogmas may lead him, without thinking for himself, to that conclusion; but when, at every step, the best writers on physiology, when speaking on any subject, are constantly using expressions of this kind:—‘Here we have not sufficient data to go upon,’ and ‘This point has not been satis-

factorily cleared up,' or, 'Here our knowledge is very incomplete,'—I repeat, then, that it is quite time for us to think for ourselves, and ask how much of what is taught us, we can reasonably believe; for where there is so much doubt and uncertainty, we have at least the right to raise the question. There are many anomalous accounts of the circulation which are worth enquiring into at the present time. There are many causes which have, no doubt, been overlooked, of the manner in which the blood is kept in a vital state—such, for instance, as in many conditions of the system where the floating gases of the body are absorbed along the whole current of vessels, whereby its fluidity and calorific character can alone be kept up. It seems as if there could be no such thing as isolating any given portions, or even properties of the living body, when everything seems to be so intimately blended.

Much has been said of the aërial state of the blood, when it has just been received by the heart and pumped immediately into the ascending aorta. Physiologists have given to this portion a power superior to that of the blood of the descending aorta, from the fact of its immediate aërication from the lungs, and have, therefore, called it more vital. But I do not exactly see this in the same light. I have alluded to the more probable fact of the aëration of the blood by endosmose throughout the whole body; and I believe that this obtains to a greater extent than we are at present aware of, and is one of the causes of the great vitality of this fluid. So that there are times when the blood aura is passing rapidly through the coats of the vessels to the parts where they traverse; and again gaining aërated elements by endosmose at other times. Now, this may

occur in the neck as well as at other parts of the body ; especially when we consider the anatomical structures abounding in these parts, and the constant movements of them, situated as they are between the body and the head. So that, if the blood sent to the brain was considered more aërated and vital, than that which other parts of the body received, I do not think this wholly attributable to the cause physiologists mention ; but as much due to what it gains by endosmose on each side of the neck, both internally through the mouth, as well as externally through the skin. There cannot, I think, be a doubt that the blood must receive throughout its whole current, large vital properties by endosmose of gases, which must assist its fluidity and aëration ; and that this is one of those chemico-vital laws which we are all in search of.

The very withdrawal of all points of inflammatory action soon after death, which may be called the *engorged* condition of the *arterial* circulation ; or where the *capillaries* have become highly *injected* ; yet to assume a normal state when the scalpel seeks a cause. Or, again, in the *congestion* of the *venous* trunks, we only trace an apparently normal state of these, as well as all other vessels. Yet we know no more, when this is done, of all the streams and vital actions that once was life, than when life itself was present. One fact a post-mortem examination often reveals, viz. that there is disease, which it was not at all expected would be found, and which the most renowned amongst us had treated for something far different. A sad termination, nevertheless, both of our diagnosis, our dogmas, and our treatment. As it must be so, let us continue

our search after that old stumbling-block :—*Something which we do not yet know.*

July 26, 1865.

LETTER XII.

SIR,—If we look around for vital agents, and see how life is manifested, we can evidently trace one distinct action in connection with the blood, and a chemico-vital agency always in the nerves. The one is, that power which the blood has, to eliminate its gases along with other elements of a fluid character, through the coats of their containing vessels; and the power these vessels have, on the other hand, of imbibing those of an opposite character; for what are yielded on the one hand, are far different to what are received, on the other. These are so manifestly characteristic of life in the blood itself, both in what it imparts and what it receives, that we cannot conceive vitality without it; and cannot view it, except as both a cause as well as an effect, of great and active material principles. On the other hand, the chemico-vital powers differ from these, because they are more electric. Asking ourselves the question; what forms these electric actions? The answer is, the presence of two opposite elements always acting in antagonism to each other, in the presence of moisture and heat. Now, there are always opposite elements meeting together in the body, whether they be fluids or solids, fluids and gases, or solids and gases; moisture being always more or less present, and heat striking everywhere. It would be unreasonable to suppose, that anything else but electricity could

be the result ; and, as I have stated in former letters, not a square eighth of an inch of the body exists, without these powers being constantly in action ; so that we distinctly see causes which ancient physiologists ill explained. *They* gave to the living structure, in order to explain its movements, ‘ a vital aura independently of all matter, and which, they said, set all the machinery in motion.’ As no engineer of the present day, gives any occult power to any machinery he constructs ; neither can I admit a vital principle in the body independent of its material substances, parts, or essences ; whatever they may be. We see how the body is sustained by the blood and how that fluid is used, how it is collected again, and where it goes to, and in its progress seeks new aliment. But, with all this, the body itself is self-supporting from the fact of its collecting its own waste and loose material from every part, by the aid of special vessels—viz. absorbents which are characterised by the name of lacteals and lymphatics. Now, the amount of floating animal matter the lymphatics continually collect and convey, in the form of fluid elements, into the blood again ; independently of that from any fresh ingesta taken up by the lacteals, is something enormous. Being everywhere present, they allow nothing to escape them, and whatever lies about, having no apparent object, is taken away by one or other of them, and carried into the nearest veins or go to the very outfalls of them. Even the veins themselves do some duty of this kind. The laws of capillary attraction and those other laws of fluids themselves, that of drawing particles to given parts, whose very actions form a vacuum, or several vacuums, are, by these means, hastened ; so that they

act by an absorbing power, aided by natural propulsion and attraction. Independently of this, they also possess the same porosity as all other vessels and substances, and their own endosmotic and exosmotic laws: so that these, as well as the larger currents of circulation, assist and carry on, on their parts, that material law of life which is inherent within them, and forms part of the principle of the great vital phenomena we see.

If we were to compare the amount of decaying structure in the living body constantly converted into fresh elements for its substance, and seeing provisions of this magnitude, made on purpose to take them up to regenerate and support the whole fabric, we necessarily ask: What proportion of fresh ingesta do we require every twenty-four hours to help it? It is impossible the body can go on without fresh matter; and it is impossible to believe that the fresh matter can alone keep up the whole structure. We see, at least, four-fifths of the blood of the body already present in it, in the shape of venous blood; lacteal and lymphatic elements assisting it. While even these elements found straying all over the body and running a risk of being lost to it, if it were not for these classes of vessels picking them up. Yet here we have another question to ask: Were they once blood elements themselves? I say, Certainly not; though they will soon be converted into them. How many pints, then, of these fluids can it be considered that the lymphatics take up in every twenty-four hours, considering they never came out of the blood; and how many pints are wasted in the wear and tear of fascial and fibrous lubrication: or absorbed by the fat for other wise and useful purposes: or exuded from the surface in gaseous or inci-

piant radiation, or removed by violent perspirations? If I am wrong, then, in saying, as I have in a former letter, that many piants of fluids are made in the body, used in the body, and go out of it; which never came out of, and are never likely to go into, the blood; let me be corrected. For, when we trace couseentively all the blood-vessels in the body, the arteries, veins, and capillaries, and what wonderful duties they perform; whilst, on the other hand, what the absorbents, such as the lymphatics, which act as reservoirs as well as collectors of what would be otherwise wasted and lost; and, finally, what the lacteals do in securing the new elementary fluids; and yet there still appears to be abundant moisture left for other purposes.

For instance, for the lubrication of the whole intestinal mucous membranes; for useful, active, limpid lymph, for the serous membranes; and, in fact, in all parts where moisture is required; and furthermore, there is what the fat absorbs. We shall find that these distinct vessels have quite employment enough, work as hard as they may; and yet leave, as I have said, a vast floating fluid current behind, for equally valuable and vital purposes.

We find by all this, that we must not be too confined in our ideas of the laws of life; because, as we proceed in our enquiries, we have to ask ourselves yet some very important questions. The great one as regards the fluids would be: Where do they all come from? We cannot reconcile their quantity with what we imbibe as drink; or what is taken from the succulency of our food; or what we absorb through our skin and tissues. We must go farther than this; but in the

elucidation of this question, we must take into consideration all the laws of digestion, assimilation, and defæcation, as well as their results; which I propose to consider shortly.

August 2, 1865.

LETTER XIII.

SIR,—Have you a stomach? Did you ever reflect upon it and ask: What can it do? and been answered by another query: What can it not do? What a host of people have written on this organ! What wonderful things we have heard of it! Scientific men and novelists have made it a subject for their thoughts and their pens. Everybody can tell something about it and its wondrous doings; inasmuch as it is the first receptacle of fresh ingesta, and presents itself as a curious and wonderful organ. At times, in certain persons, in certain conditions, it can receive nothing of consequence—scarcely enough to add the one-fifth of the raw material required for the system—and at others receiving with impunity double and treble the four-fifths which the system makes itself; and yet can somehow dispose of it. I have a young girl under my treatment now, in one of those singular conditions of hysteria, who has existed, and looks well too, on one potato for dinner and a baked apple for supper, and this is all she has consumed for eighteen months; and what she drinks is extremely moderate in quantity; she has a good, rosy colour, and seems to enjoy life in her way amongst her friends. Is that enough raw material for her? You would say: No, certainly

not! Yet it appears so. She has also tolerably regular actions on the bowels.

I knew two brothers in the Medical Profession; one came to grief in the Fleet Prison some thirty-five years ago. He was about fifty-five years old; a large, powerfully-built man, with what would be called now 'great organs of gustativeness,' and with an underlip like a cod-fish, which time out of mind marks a gourmand. I called upon him one day at the old Fleet Prison (the portal alone is now left) while he was unpacking a hamper from the country, containing, amongst other things, a small, but very delicately boiled leg of pork, perhaps weighing five or six pounds; such as the sender knew he loved. He gloated over it, and with knife in hand began cutting from the knuckle, and made, like Adam, his left forefinger and thumb his fork. He kept on, and on, and on; it was evidently disappearing during our conversation, along with a bottle of sherry. 'I wonder,' said he, 'when they will bring my dinner; they don't cook at all well here, and are never punctual.' What had he ordered? Only four pounds of veal cutlets and a pound of ham, with potatoes, which, when they appeared, filled a vegetable dish. However, the dinner had to be waited for; but it did not stop the progress into the leg of pork, whose meat gradually disappeared. At last the bone was taken hold of by the handle, if I may call the knuckle end by that name, and every bit of meat and gristle carefully cut off and sent the way of all flesh. In fact, the bone was picked! Then the watch was removed from the deep fob below the waistband—it would be now called a small warming-pan; 'Dear me,' said my friend, 'they're an hour behindhand

with my dinner again.' At last it appeared, in a large dish, swimming apparently in an ocean of fat gravy. The delight was charming; and my friend set to work as if he had had nothing for a week, and soon demolished it all, potatoes into the bargain, and scraped the dish out with plenty of bread. Besides this, I remember there was no end of bread and cheese, with stout or porter in full-bodied pewters: and I left him with a bottle of sherry before him, which I have no doubt he finished. Now, this man was great in bulk, and I knew him some years before as a regular clearer of all dessert at great dinners, demolishing everything, whatever there was at table; not a dish ever went away with a thing upon it. The confinement in town, with, no doubt, other matters, caused a sudden illness, of which he died, and I attended his post-mortem in the presence of a physician who had paid great attention to pathology. He declared he never saw a stomach with such capacity. I had not till then seen anything like it; but it made a great impression upon me. Now, his brother was a tall, wiry man, who had worked hard as a country practitioner's drudge, going fifteen miles of a night to a fifteen shilling labour. He became dreadfully poor, and was, when I saw him last, about a year ago, eighty years of age: as upright as a dart, and could walk on errands twenty miles a day. He has told me he has gone down to Croydon from London and back for one shilling, and never tasted food nor even drank water from the time he left till he returned. He said he dared not do it, or he should never have returned; it would have produced so great a somnolency. He used to come to me for a shilling occasionally, 'out of remembrance to his brother.' He

told me that he could live comfortably on sixpence a day, lodging included, and how he managed it; and as long as he could get this he would never go to his parish. But even this failed him at last, and I lost sight of him; though the last time I saw him he was hale, hearty, and erect; but I suppose he succumbed to circumstances. He may yet be alive, unless the dietary of a workhouse proved too much for him; and this fact we often spoke about, and he said he should be afraid to take too much at first. A small piece of bread and a cup of tea, at eight in the morning and five at night, was all he had or had had for years. Now here is a contrast; the one brother being just as much a wonder as the other to the physiologist. But look again at what is done for wagers in the way of eating! ‘A large shoulder of mutton and turnips,’ to be all eaten in a given time; several pounds of fat pork at a country fair by a country yokel for a smock frock. It is only lately an elderly man was pointed out to me as HE who ate at the Red House, Battersea, for a wager—a leg of mutton, a goose, a large pigeon pie, and sundry other things, besides a certain amount of drink;—and won the wager. It is scarcely conceivable what is consumed by some persons at a feast, and unless it is measured, as was once done in such a way as this, it would be thought impossible:—A great gourmand was watched by two persons, and orders given to have a similar quantity of everything brought to them to what this gourmand took; plateful for plateful, glassful for glassful; whatever it was. It was duly cut up and put into a pail, which became ultimately considerably more than half filled. Travellers, they say, see strange things and record stranger; but in

their works, most wonderful stomach feasts are recorded of uncivilised races. All this which we know to be true, is it not recorded? Yet, on the other hand, has it not been seen in many well-ascertained cases how little can sustain life? As many observers have seen these facts in their practice, both of large and small feeders; it becomes the duty of the physiologist to account for them. How and by what means Nature can, under circumstances, without apparent danger to her machinery, receive, appropriate and pass off in the usual way such an enormous amount of raw material, even without injury to the consumer; and, again, how little another can live upon. The question which arises from these facts of inordinate eating or gluttony, or even, in fact, of ordinary or extraordinary good dinners, is: What is the peculiar character of the secretions of the receiving organ, the stomach, and in what these differ from the character of the ingesta? If the secretions of the stomach and the ingesta consisted of the same chemical constituents, I do not see how destruction of them could take place; but if of opposite characters, then there is some clue to the powers the stomach must have over what it receives into it. The greatest macerating and destructive elements we have in our laboratories are the acids and heat. Hence, Nature, ever wise, provides the stomach with both of these; and it can only happen where they are in excess in any individual, and the powers being tried by usage, that he can accomplish great undertakings; because he knows what he can do. Taking the stomach with its anatomy and physiology as we know it, and as it is taught both in schools and books, we find its muscular powers greater than any other viscus; and that it has

the peculiarity of secreting an acid, called *par excellence* 'gastric,' approaching in macerating power to pure muriatic acid. Independently of this, physiologists say, that during the time of eating, the secretions of the salivary glands have a highly acid character. But these are of a less powerful kind than those of the stomach. Nevertheless, they are very useful, because they add immediately to the stock in the stomach. Here, again, is another instance of the law of diluents. When no mastication, or eating, or digestion occurs; then the secretion of the salivary glands takes an alkaline action, and the stomach even does the same; though both are roused in a moment to their opposite actions on the least occasion of food or drink being applied to the mouth. The importance of this should always be borne in mind, as I will further illustrate in my next.

August 9, 1865.

LETTER XIV.

SIR,—To continue the subject of the stomach from my last. Acid and heat are evidently the two great elements which act on fresh ingesta. We have now to ask: What are the first chemical properties of fresh food? There can be no doubt whatever that it is an alkaline mass, excepting always the direct acids, such as vinegar or pickles, which we consume as incentives to appetite, or as grateful in many ways with certain meats. It is very evident, then, that it is all important to the system, that the secretions of the stomach and all the salivary glands should be highly acid; otherwise the

fresh alkaline matter taken would never be reduced as it is. When there is a deficiency of this acid secretion in the stomach, as in long voyages, where salted meats are taken for a continuance, which evidently have the effect of reducing the powers of the organ itself and also that of the glands, to secrete; that certain diseases are engendered, such as scurvy. While on land, if a system is reduced to a similar condition from other, though no doubt similar, causes, an approximating disease known as *purpura hæmorrhagica* ensues. This latter I have always called *land scurvy*. In both cases, and especially in scurvy; fresh vegetables and meat with lime juice have been found *empirically* to be the best antidote. Now, leaving out the lime juice—for a course of any of the other acids would be just as beneficial—what are we to infer from the fresh meat and vegetable diet alone, when there even appears no gastric acid to act upon it? Therefore, the theory of the secretions of the stomach and the new ingesta, being necessarily of opposite character, would fall to the ground. Nevertheless, it does not so, for this reason; that when the alkaline mass of a fresh meat meal has been reduced to its ultimate elements; acid reactions take place, pretty much the same as when sal volatile is taken into the stomach, the alkali is destroyed, and an immediate presence of nitric acid ensues. Again, the great alkaline manufacturers, in making soda, cannot dispense with large quantities of sulphuric acid; yet no trace of either this acid or its gases are contained in the soda. A third action was noticed by myself, some years ago, of a man who had alkaline urine, and his medical attendants were incessant in their use of acids to bring about the action desired; but

without effect; yet his whole system showed an extremely acid condition of his primary secretions. As the consulting physician, in presence of others, I ordered drachm doses of carbonate of soda with half-drachm doses of sal volatile in an ounce and a half of water every four hours. 'But,' said my colleagues, 'you do not understand the case; the man has already alkaline urine.' 'I perfectly understand this,' I replied, 'and that is why I am here; give him what I order, and you shall have as much acid as you want in his urine by to-morrow morning.' And so it happened, to their great surprise. 'What was the cause of this?' 'What was the rationale?' were the first questions. My reply was simply this: 'When you treat the body and its elements as you would elements in your laboratory, you will find out your mistake, and that strictly chemical physicians are always at fault, and seldom see satisfactory results.' All the above facts should be taken together, and when the time comes for me to treat of disease they will be explained.

It is very evident that the stomach in a healthy state of secretion and usefulness secretes acid largely; and is assisted by the salivary glands during the time of eating. Now, the stomach being filled, is necessarily distended; in this state, the gases which are generated must act in the first place on its contents, as also on themselves, as well as finding their way through its porous coats. Hydrogen gas forms more or less a part of these; but is quickly absorbed by the quantity of oxygen coming down with every mouthful of food, and more largely so with what we drink. We cannot suppose that the quantity of this latter gas can remain unaltered for a moment; if so, we question much of our

chemical knowledge. We must then believe in its immediate conversion; for nothing in fact can stand still or remain a fixed element which enters the system in any way; whether in the form of solids, fluids, or gases, by the mouth or by absorption, or whatever is made in the system, but that instant conversion and change takes place. Here, then, is one fact of two gases making a fluid; the hydrogen generated in the stomach being mixed with the fresh oxygen coming down with the food; for it is well known by everybody, that however thirsty they are and begin eating, even without drinking, that thirst goes off. Here is an instance of a fluid being made, entirely independent of any secretion or excretion from the blood:—In our search after gases in the body, we are not long without finding them. The full stomach cannot be distended with fresh ingesta, without fluids being made in the way I have described for its assistance; or without the gases, when formed, being forced through the porous structure of the stomach itself. Of whatever character these may be, they no doubt fulfil a vital duty. If they escape from the stomach into the shut sacs of the system, they become absorbed. We have only to reflect on the mass and number of the lymphatics about the stomach that do not remove elements, which it is the duty of the lacteals only to take up; but they remove excess of fluid elements floating about, and, what is more, imbibe the gaseous aura traversing everywhere, and convert that in their currents to something else, equally useful and no doubt vital to the healthy state. As it is, the duty of the stomach is to macerate and make a homogeneous mass of everything. No sooner is this done, however partially and in small

quantities, than there seems to be an army of policemen ready, whose sole duty is to order a—‘Move on, Sir, move on, move on; you must not stop here, Sir!’ Why should it? It is a prepared mass, ready for the next stage; what business has it to remain longer than necessary? All, then, is confusion, bustle, conversion, change, haste, and general movement! Whatever is first ready must move on; that which requires more work to be done to it, is thrown back into the general mass, and, as it must be done, the stomach will do it accordingly, and in obedience to its functions. One of its great peculiarities is a spirit of election and requirement of solid materials; in fact, it likes to do its own work. Many people, ignorant of this, talk and write as if our cooks ought to do in the kitchen, that which the stomach prefers doing for itself. To keep it in a healthy state, then, it should have solids to act upon. How often do the rich use their wealth to make disease, and so lessen the number of their years in the enjoyment of it! ‘What!’ said a fat little wealthy man to me once, ‘do you think I am going to let my stomach do what my cooks only ought to do in their kitchen for it?’ ‘Why, then, do you come to me? It appears you have let them do this too long and not asked permission of your stomach; and when you have reduced it, as you have, to a mere cipher, and can digest nothing; you come to me to enure you. I tell you, Sir, you have so insulted your stomach, that it is now in open rebellion, and won’t do anything for you. Tell your cooks (for he kept two) to put some hobnails and marbles into your soup instead of maccaroni; and when you eat it don’t bite them or they will break your teeth, but swallow them whole, and you will then give your

stomach something to do. If you don't like that, order a steak off an ox which was killed this morning, and it will then be tough enough, and have it for your lunch, and astonish both your cooks and your stomach.' He took the hint, for he saw the spirit of it, and I took his fee; but I gave him no medicine. Accustoming his stomach for a month to perform that duty which physiology has pointed out by all its laws and all its provisions, he came to me a better man. If we are false in our dogmas, and have not anatomy and physiology constantly before our eyes and ever present in our minds in every case; we become the poor physic-giving tools the public tell us every day of our lives that we are. I shall have something to say some day on medical and physicians' dietetics; and of those who make greater disease in their patients' systems than they find, through following a blind routine.

To return to the stomach. Its great physiological duty is to have something to act upon; something to employ its powers upon. Here, then, we have gases formed in immense quantities when in a full state, performing their duties within the organ; others permeating every part of the viscous, finding ready recipients everywhere; there is moisture around it, within its coats, and inside its cavity. Much of the moisture is absorbed by the fat and by the omentum; besides supplying all other adhering fat. The diaphragm gets a full share of these elements, whether fluids or gases, and takes whatever it can. This great dome, which supports the lungs and heart, carries through its porous roof the elements of nutrition to the pleura; while the ever ready and accompanying lymphatics take off the waste. How can it be imagined that all the valuable

and vital principles of the body are supplied with reproductive elements, wasting, as they are, like everything else; unless it is from the ways and means I have pointed out, and which I have declared the blood cannot do; the blood simply supporting structure, and all these other adjuncts assisting secretions, through the inorganic diluents?

August 16, 1865.

LETTER XV.

SIR,—One of the great benefits of new ingesta is clearly seen, to be the conversion of many of its bases into fresh acid elements; to be ready for the next call upon them for all those primary purposes for which they are made. The next uses are evidently for the generation of gases; without which the expansion and contraction of tissues would never ensue. Besides which, the lubricating fluids would be stopped; such as we see in fevers. Both these actions, which are the actual result of decomposition of opposite elements, have certain electric and heat evolving powers. We naturally conclude, then, that as long as the stomach has anything within it to digest, so long is heat and gastric acid generated, with large amounts of gases; and so long will these gases permeate its coats and become absorbed in the tissues beyond them. Heat and acids are also disinfectants, as well as anti-putrescent powers. The foul birds who feed on carrion, and animals who do the same, all show this, as well as the true lovers of game in a high condition.

A correspondent asks: 'What is the cause of heat

in the animal body?' and suggests, 'the friction of blood through the walls of its vessels.' The causes are everywhere. Some of them I have just named; and I do not see how it is possible, that when the body is acting in full vigour and health, with all conversions which are taking place throughout it; that anything but heat can be the result. Friction of the blood alone, along the course of vessels, is not sufficient to account for it. Even the friction of muscles over each other, though producing heat largely, as we see in all kinds of exercise, is still insufficient. I have in other works said, Wherever there is union of elements, heat is evolved by combustion. *Even the very friction of the blood through its vessels causes heat*; there is not a part of the body which does not, in the metamorphosis of its structure, emit heat; and therefore the caloric is well kept up. Did my querist ever make the dilute sulphuric acid,—an ounce and a half only of the latter, to fourteen and a half of water; so that, when mixed, he could scarcely bear his hands tightly round the containing vessel? Or, in pneumonia; to place his hands on the patient's chest, when he would find the same kind of pungent metallic heat. He need not go far to have his question both chemically and physiologically answered; for the chemical evolution of the latent heat in the body, which is supposed to exist everywhere, is something enormous. The simple friction of two pieces of wood, or a stick of sealing-wax rubbed briskly on a piece of cloth, shows this.

When the stomach is empty, a far different fact occurs than when it is full; for when empty it becomes an absorber of gases from its external to its internal coats; and these gases are the hydrogens,

nitrogens, and earbons. Its altered condition as an empty organ shows this as well as its neecessities. Oxygen is not a free gas in the serous tissues; but the nitrogens, hydrogens, and earbons, and in their combined states, are, and permeate the coats of certain parts of the alimentary canal, and there meet with oxygen. In the stomach, oxygen is for ever swallowed freely; saliva, constantly made to an indefinite extent, is always earrying it there; and this constitutes in the fasting or empty organ a means of moisture in itself, independently of its own secretions. It has often puzzled, both our philosophy as well as physiology, to account for a daily action on the bowels of some people, in far greater proportion to what is taken in solid ingesta by them. To this well-known fact, we say, 'Oh! there's always something there.' If it was not for some law of the kind I have mentioned, together with the natural cohesion of fluids, the formation of solids by inspissation of gases and fluids; and union and mixture again of all these combined, we should not probably have these facts to record, but, seeing them, then such phenomena can well be accounted for. They are simple enough—and what organ so proper to receive and amalgamate them as the alimentary canal throughout its various parts, and then to convey them into the colon? It seems an action of neecessity for a law of this kind to exist, or the calibre of the alimentary tube would run the risk of being closed up. The meconium of the fœtus illustrates this in a marked degree, in whom no alimentation or digestion ever takes place. It is simply a mechanical, as well as a chemico-vital law in Nature that it should be so. The stomach, even in its empty state,

is yet somewhat unceasing in its action, though at that time it does not secrete acids; in fact, it reverses this, and so do the salivary glands, and both their bases of secretion become alkaline. In many interruptions to the healthy standard, bile will regurgitate from the duodenum, through the pylorus into the stomach, where it has no business to be. This condition always causes nausea. It also impedes or interferes with the secretion of true gastric acid, and vitiates it when it is secreted. It is then when people vomit bile they say they are bilious; and the profession, not caring for its physiology, confirms them in their error, for both agree to attribute the cause to the liver. Some ill-conditioned state of the duodenum, or some misunderstanding between this viscus and the stomach above, is the true fact of the matter. Vomiting certainly clears it away from where it has no physiological right to be; but if it is not ejected in this way, we ask: Which is the best plan to get rid of it? Not by giving blue pill! Not by aperient medicines! Not by alkaline carbonates, even if combined with acids as effervescent! It is simply to ask: What is bile? A powerful alkali! Then its proper antidote is acid, and any of the acids soon remove it. It is at most a functional derangement of the simplest character, to be most pleasantly as well as most completely removed, and no organ to be considered out of order. The stomach is often most irregular in its action, according to the individual or what he takes, especially as concerns digestion; but digestion much depends upon the quantity, quality, and variety of the food and drink taken. Perhaps it has never been physiologically considered in its relations to other

organs. I have never seen its sympathies with the colon at all considered; yet there is no greater field of observation than this. With regard to digestion; the stomach takes a most varied range in time for this act to be completed, and many things often interfere with it. Are these to be considered in any way influenced by the colon? I have abundant reasons for affirming this. Many hours after an aldermanic dinner, when much wine, and that of a varied character, has been taken; the stomach will disgorge the greater part, and many perfectly undigested morsels will come up. Now, it has never, as far as I have seen, occurred to physiologists to ask whether this was a mere act of the stomach itself, or a wiser one of the sympathy of the colon. I am bold enough to say, that the sickness was a direct hint from the colon. If digestion had been completed, and the contents of the stomach gone in the natural direction; whether the colon could suffer with impunity such a mass to come into it, and if it could not without injury to the system, it was the party that stimulated the direct disgorgement of the mass by the mouth. We shall have abundant reason for this view of the matter hereafter. Such masses of food, however, have their influence upon the system, while they are yet within the stomach. In an ordinary vomit of an ordinary meal, of what the stomach cannot digest, or what, if it could, the colon could not receive, there is abundant reason for showing that this organ gives the hint for its rejection. The sour gases rising from even this disgorged mass are bad enough; but let the aldermanic dinner, with its variety of food and wine, after being churned about for many hours in the stomach,

be rejected. What are the gases like then? Bah! they are horrible. What was the condition of the system before they were wisely discharged out of the stomach? Why, that they forced themselves through its porous structures, poisoning everything. Their gaseous fumes etherising the brain, making it whirl; and the senses, all confused and demoralised, are at last quite subdued. All this has arisen from a plethora of gases in all their primary forms; but all such in proper quantities and at certain times are necessary to the system; in their excesses only do they become pernicious. When the stomach is thus emptied of more than it can digest, yet the gases being still generated; a natural instinct and common usage seem to have taught mankind the true physiology for recovering from such excess--namely, plenty of fresh air (oxygen), plenty of cold water (oxygen again); and all this without disease ensuing, or scarcely a twelve hours' functional disturbance, as the whole system once more rights itself. If the body and its secretions were what some would make them, a little bout of this kind ought to make whole regiments of disease; but it does no such thing. The only excuse for it is, that it is done accidentally in good company; such as may occur from taking sometimes a little more than necessary to rouse some of the latent slumbers of the organs and their secretions, which often do more good than harm; but ascending this scale in the various gradations, it may be done too much and too often. Physiology has gone so far as to admit all this; but has not gone far enough to understand the true meaning of the facts. Depend upon it, there are other regulators of the stomach's actions, besides

what depend on the uses and the laws of the stomach itself, and we must find them out. For it is not the generous liver, or the *bon vivant*, who has the most diseases; and if there are sins of commission to the system, there are also plenty of those from omission; and these dietetic starving sins of disease, are often the most difficult to manage, as well as the subjects of them.

August 23, 1865.

LETTER XVI.

SIR,—From the observations contained in my last letter, it will be clearly seen, that gases act in the system largely, both for good and evil. Generated as they are in the active stomach in all meals, they have their special influence for the benefit of the individual; and we cannot wonder at the stomach being an acid alembic of the most important kind. It is not my province to encroach upon the chemist's science; but I can appeal to those laws which chemistry has already developed, and which it has much more to do with, to show the analytical bases of acids, and that it is totally impossible the system could exist as it is, without its well and regularly-formed gaseous aura being everywhere present. And here I say that physiologists have been hitherto too much given to view alone the solid and fluid constituents of the body, and have not sufficiently studied the gases. I have no hesitation in saying, that in bringing these more prominently forward, greater progress will be made towards the understanding the wonders of the body, not only in its laws

of health, but in its laws of diseases and treatment of them. The gases made by the stomach in all its digestive acts, can at least explain the reason why that organ, more than any other, secretes its own peculiar acid, for no other does the same, and hitherto this fact has not been sufficiently explained. To show the extent to which its coats and substance are impregnated with this, we use *rennet*, or portions of it, to make curds and whey with milk. The medicine called ‘pepsine’ is fabricated from it, and so the medical fraternity ape the old practitioners, who they would probably laugh at now, in the stewing of foxes’ lungs, as a remedy for certain diseases of those organs in the human body. The ancient Pharmacopœia and treatment of disease contain many such things, equally fanciful to our present generation ; which serve us to wonder and laugh at ; but not more so, probably, than many things we do now, for the amusement of a future generation.

I have said in a former letter that the study and writing on physiology lead us to sudden jumps. I am compelled to deviate from the strict line of my proceeding in taking the organs regularly, by occasional questions of correspondents on the subjects most prominently presenting themselves. Thus, a correspondent of last week has given two cases of erratic cholera in a mother and daughter, and asks me to explain them. I feel, therefore, compelled to discontinue the subject I was engaged upon, as many of the periodicals, both lay and medical, are teeming with all the old doctrines, views, opinions, dogmas, and systems, to meet a probably impending cholera. Everybody admits its existence, and no one pretends to know what it is. The ‘*Cholera wave*’ is the last new idea ; and that animals

have epidemics as well as human beings; also, that when an epidemic comes to them, another or the same, or a visitation similar to cholera, seizes mankind somewhere and spreads all around. Now, what is the 'choleraic wave'? Is it a solid, a fluid, or a gas? Do insidious solid or fluid elements come over the seas, borne by the aerial currents, from infected places and persons, and become swallowed and absorbed by others in other countries? If so, it is a very wonderful thing that they have not been so well buffeted as to have disappeared in the ocean *in transitu*. Supposing this insidious substance is neither solid nor fluid, is it then a gas? an aura? which nobody can seize to weigh, or measure, or analyse; which, by the way, the meteorologists ought to have caught; the same as they have done the ozone and antozone, and such like allotropic forms of oxygen; so that they may lay the blame to them, and not to the bastard oxygens? Well, whatever it is that comes or does not come; and whatever is the cause, the influence of malignant stars of the ancients, or these modern fancies, to account for what people now-a-days are honest enough to say they know nothing about,—something, nevertheless, produces a rinderpest or murrain in cattle, or a cholera in men. The former is now present amongst cattle, and an epidemic is expected amongst men. Now, why not, for novelty's sake, make observations nearer home, and ask: What are the conditions of our own self-generated gases? I have already, in these letters, spoken of the electric aura and special electric conditions of our own bodies, producing disease without any contagion or contagious influences at all. Far down in the country, we have generated by two women, a disease simulating

cholera, which appears to have been very nicely and judiciously treated *empirically*. No scientific observations are made by the writer; yet we ought to elicit some science out of them.

Here, then, the elder female first suffers from an evident war of morbid gases in her system, from some disturbances in the secretions. Irregular electric action first takes place in all the secretions, and the system cannot regulate them. Poisonous gases are always present in the system, and we cannot do without them, which, from some rude shock, will not combine as they do in health; and so they set themselves free. Vomiting and purging of noxious matters caused by them, ensue. Here, then, the electric batteries are thrown out of gear, and, in the present language of telegraphy, we have only *earth currents*. All those fluids necessary for the due lubrication of tissues are removed, which, I have elsewhere said, never came out of the blood, and would never go into it; yet they are most useful in the animal economy. How stands the theory of the blood of the old school, which ought to have restored the system? The writer says of his patient; there is ‘a purple colour, cold sweat, pulse imperceptible, lips livid, breathing quick and spasmodic, appalling expression of countenance, &c.’ Some would say: ‘This is the effect of choleraic blood poison;’ which, like the philosopher’s stone, all the physiologists are looking out for; in order to get something to inoculate the people with and destroy it, as they do the small-pox virus with the vaccine: but I tell them—they won’t find either. Well, there was ‘spasmodic jerking every few minutes, not unlike tetanus,’ with some ‘opisthotonos.’ Do we not have these twitchings also in broken limbs? Why do

we want to fix them? Splints keep the bones in apposition; but they also prevent these tetanic spasms from displacing them. Electric currents being destroyed by ruptures and displacements, their aura no longer traverses the wires or nerves in any continuity. The same phenomena occur in sprains of long tendons, without broken bones. In these cases, however, we have increased caloric; because we have elements in excess which are the generators of electricity, and are the natural heat producers of the body. But when these are suddenly removed, as in diarrhœa and choleraic actions, what is the consequence? Why, precisely what the writer has said. Mind—not a drop of blood has been removed; the fight is all between the gases and those fluids, with which the blood had nothing whatever to do; and very merciful this is for the patients; for that element is still left to make and uphold structure. Let us review the rationale of treatment: chlorodyne is given, which is a powerful sedative. This suddenly arrests the wilful conduct of these erratic gases and uncombining fluids, which produced them; and a temporary stop is put to their malicious acts.

In these cases, the positive currents of nervous sympathy rush to the centres; but the batteries being suddenly deranged, no negative ones are returned. Viewed in the light of art and empiricism, the turpentine flannels brought them again to the surfaces, and these were assisted by the strong brandy and water. The soothing influence of the mixture, composed of chalk, acacia gum, cinnamon, catechu, &c., gave the elements in the alimentary canal something to do. Chalk took up loose fluids, causing cohesion; and fresh combinations were instantly made. By all these

means, in forty-eight hours, that state which threatened life was reversed. All these remedies were, in the first case, most appropriate and satisfactory, and can all be explained. The exhaustion had produced coma; but when all the causes for its continuance had been stopped, the first effects on coming out of a state of coma was, 'a tingling all over the body and extremities.' 'I think,' says the writer, 'caused by the turpentine applications.' Let him rather say, in scientific parlance; that they were caused by the gradual return of electric actions, from restoration of the galvanic batteries throughout the body, exerting their beneficial powers over the whole nervous system; and these, again, over the heart and general circulation.

The second case seemed like the first, only more severe; but, being younger, she was better able to bear it. This case was treated most judiciously in the same way, and recovered like the first, by the same laws acting in the system. Now, as these are cases which happen frequently; the first object should always be to stop pain, arrest the fluxes, and restore electric actions. The only fault is, that the Faculty, when they have succeeded so well in this; often undo all their work by giving opening medicines too soon, and so bring back all the symptoms they had so much difficulty to arrest. Why not let the bowels remain quiet for days and days, if necessary? But if, as in the two cases related, they act naturally, nothing can be said, especially if the stools are somewhat consistent. Nature is all wise; but even this should be regulated, for there is much to be made up before the colon gets full enough for all purposes. The 'cord-like feeling across the chest, not unlike angina pectoris,' was evi-

dently from the shock to the solar plexus ; for it is from this centre of nerves that the spasmodic cramps arise in true Asiatic cholera, and continue until the electric currents are re-established between the brain and lower extremities, which can only be done through the solar plexus. Then these spasms cease ; and this fact is always to be watched, for when it occurs a good prognosis may be given. Here, then, I conclude and praise the treatment. But, on the other hand ; supposing the same writer, or any other man, saw apparently the same phenomena in other patients, and did the same things and failed ; what could then be said ? Here, then, is the touchstone—the difference between empiricism and science. The cases already quoted evidently showed a highly congestive and acid condition in both individuals, and the alkaline sedative remedies cured them.

Now, it might happen, as I have previously said, that other cases, apparently similar, would die under the same treatment ; then, I say, they were not similar, but in fact totally opposite ; for, instead of being congestive or acid, they may be highly inflammatory ; in which condition there is a great want of the vital acid gases and secretions in the system. Opposite remedies must, of necessity, be employed, and these would consist of the acids combined with sedatives and opiates—the choice of these resting with the prescriber. To discriminate between the congestive and the inflammatory type is what we want ; for on this hangs all differences of opinion and treatment in cholera, fevers, &c. For if the chalk and other alkalies are given in the latter, and acids in the former, they aggravate disease in both cases. While in both, the anodynes and opiates may be used to relieve

pain, for pain is an exaggerated act in the system, that in any case ought to be relieved as quickly as possible ; because intensity is given to, and kept up, in the vital-electric nervous system while it lasts ; and which always has a tendency to ultimate prostration of power. To use the term ‘extreme hyperæmia of the spinal and sympathetic nervous centres,’ is as difficult to understand as to apply, and which phrases only tend to make physiology so hard to be understood.

Whatever cholera is, how engendered, how caught, or propagated, is the problem of the day. Popular writers on this give us the idea of ‘atmospheric infection,’ and, if so, the cause must be invisible and subtle, and in every case an aura similar to that conveyed along telegraphic wires. If, then, it is an aura or a gas, it cannot immediately affect either the solid or fluid structures or elements of the body ; because it must first mix with elements of its own kind, and, when so mixed, the product then affects the more tangible one of fluids ; and these again must act upon the solids, and so the agency gathers power in the system and produces the effects we see. Nevertheless, as long as these two distinct actions remain unrecognised by science, so long will men be deceived and disappointed in their treatment ; for what will cure one will kill another, and *vice versâ*. Thus, when opinions and practices have gone the old old rounds of the treatment of the cholera *we are going to have*, we shall come to the mind in which we all stick so fast now—namely, that we none of us know what the disease is, and that one treatment is as good as another ; and that the epidemic will have its certain number of victims, because prejudices are not to be overcome ; and the Faculty will not move in the right

direction to find out why and how they sometimes cure ; and why and how they as often fail. Thus they conclude, that it is all a matter of accident, and follow the golden rule of ‘*secundum artem.*’

August 30, 1865.

LETTER XVII.

SIR,—There can be no doubt from what I have said, that the gases perform a most important part in the duties of life ; oxygen being as necessary to portions of the alimentary canal to assist digestion, as it is to the lungs to carry on respiration. As I proceed I will endeavour to show that opposite gases are also as necessary to vitality as oxygen ; many of the primary disorders of both the lungs, stomach, and upper extremities, are due to the gases ; more so, perhaps, than we are at present aware of, and more than to the secretions themselves. These latter having been always considered more tangible ; physiologists have singled them out in order to hang causes upon them alone. I mention this, because the expressions used in medical phraseology seem to confirm this view ; such as ‘correcting the secretions,’ ‘attending to the *primæ viæ*,’ ‘acting well on the liver,’ ‘clearing the bowels,’ &c., all which imply doing something or other to given states and conditions of the secretions, while nothing whatever is said of the gases, or the wonderful and important actions going on in Nature’s laboratory through their agency. I have in vain searched both ancient and modern physiological works for what might be said of the gases absorbed or generated in the body ; but find them entirely silent on

the subject. Much of course is said of 'skiey influences,' of 'malaria,' of 'aërial poisons,' of 'subtle gases,' 'atmospheric infection,' &c., which are all outside and around us; but those in the body seem entirely ignored. On the other hand, as opposed to the malignant ones, we have the beneficial; and therefore much is said of 'free air,' 'plenty of good oxygen to the lungs,' and all such like; which presented themselves equally to the ancients as well as to ourselves. But what more is known of these, than what the ancients told us two thousand years ago? Surely we ought to know by this time more than what they taught us!

As concerns digestion, when any portion of the mass is ready to pass through the pylorus it does so. Now, much of the activity of this mass called chyme, depends on its being charged with oxygen, as well as other gases, which keep it bubbling and lively: as on any other law of its passage through the stomach to the duodenum. Here, then, it enters into another beautiful organ, for a totally different process to be performed upon it. This viscus, I think, anatomists have jumbled up too freely with the small intestines; for their books say these intestines commence with the duodenum. Now, the small intestines differ as much from the duodenum, as they do from the stomach, or even the large intestines. The stomach is evidently a kneading, pressing, calorific, acid, gaseous alembic, for it does all these things, as everybody must admit, and destroys the character of everything but the fat and oils. These it only separates from all other parts of the chyme; but only so far as to leave them mixed up but not amalgamated; nor is it designed that the stomach should do more with them. We should not want either duodenum, liver, or pancreas, if it did:

and, what is more, the whole economy would be entirely altered. For what, I ask, would happen if the whole venous circulation from the abdominal organs, went direct to the thoracic duct and thence on to the heart? Nature, therefore, made two organs separate and distinct in their character, for two opposite purposes in the processes of digestion : one, an acid ; the other, an alkaline alembic. Physiology says, that owing to the number of combining arteries around and about the stomach, ‘abundance of gastric juice is supplied to the stomach by their exhalation.’ I hope I have corrected this idea, which seems to have no foundation, as other arterial blood in other parts ought to do the same. I think we should be altogether in a rare mess if such was actually the fact. But then the human mind must always have some basis to rest upon, and we often find, that many generations of men are as satisfied with a fallacy as a truth ; but when the latter is found, the former falls through in the easiest way imaginable. Against this doctrine, physiology also says, the venous blood of the abdominal viscera goes to the liver to make bile,—an alkali ; so by an *à priori* reasoning, arteries exhale acids and veins secrete alkalies. Now this will not do for the present day, at least I should think not. I therefore prefer my own theory of getting gastric juices from the sources I have mentioned. However, it is certain that the liver makes bile ; which is a powerful working secretion, for the express use of the second stomach, the duodenum, which is as distinct an organ for a second process of digestion as the stomach is for a primary one. What does it receive to act upon? Chyme ! Imagine a cream-like mass made up of everything that fancy dictates to be put into the mouth to be masticated,

enjoyed, and swallowed. Within, round, and about it, are pellicles of fat and oil, containing air and water to a great extent; else, when the chyme got into the duodenum how could an alkaline fluid, such as the bile, permeate it so readily and mix the whole mass, previously so atomically disunited, into one homogeneity, and that, too, in the shortest possible time? Now, physiologists say, that the separation of the recrementitious from the nutritious elements of the chyle, is performed in the duodenum; but this I must demur to, and decline believing anything of the kind. The mass of chyme from the stomach being acted upon by the alkali of the bile in so beautiful and so regular a manner, is held so lightly together in all its chemico-vital characters, as to be a marvel to anyone who would attempt to discriminate by any powers in his laboratory, of what would ultimately be fluid or what solid elements. No separation takes place at all in the duodenum; otherwise chyle would go out of it in two distinct parts, which is not the case. Besides this, there is another fact to be considered, namely, that the duodenum is the first organ we come to which may be called conservative. For this reason, that, unlike the stomach, wishing to get everything out of it as quickly as possible, the duodenum has a power to retain its elements by the simple process of dilatation of its coats. Indeed, if it was not for this, alkalisation at certain times would not be sufficiently performed; and perfect chylification would not take place; and this is another reason opposed to any doctrine of separation of its constituent parts. Its numerous *valvulae conniventes*, its curvatures, and their divisions, its being imperfectly covered with peritoneum, and other circumstances; all indicate a law of arrest to too great

rapidity of its duties. There is another fact to be borne in mind, which is the secretion of the pancreas. Are we to give one law to one set of salivary glands and another to another? I fear that it is these inconsistencies which often destroy an uniform philosophy in medicine, as well as physiology. If we believe that, during the consumption of our food, the bases of the secretions of the salivary glands, become acid, they evidently act as diluents to the more caustic gastric acids in the stomach. Whilst, on the other hand, their chemical bases become alkaline along with the stomach secretions, when little or scarcely any digestion is going on. All this appears both wise and thoughtful. On the other hand, are we to say that, as the chyme comes down through the pylorus into the duodenum, that the pancreas, a salivary gland, secretes only an alkaline fluid? My opinion is, that our physiology is at fault in regard to this; and that, owing to the extreme alkalinity of the bile during active chylicification, there would be excess of this valuable agent. In order to guard against this, the salivary secretion of the pancreas at that time, partakes of the same character as that of the primary salivary masticatory glands; the bases of its secretions being necessarily of a more acid character.

Now, this would give a more fermenting and effervescing character to the mass; and, as the idiosyncrasy of every individual differs so much, some taking large amounts of fluids with their food; some very little, and others sometimes not being able to get any at all; we must seek for fluid properties and powers even in the alkaline digestion of the duodenum. The very fact of its not being wholly invested by peritoneum implies, that, receiving oxygen in sufficient quantities from the

stomach, it may yet be deficient in aqueous elements. Notwithstanding the fatty and oily pellicles which carry them largely; and though the bile and the saliva from the pancreas are also fluids; it may nevertheless require more, and if it does, where is this to be obtained? The answer is simple; namely, that it absorbs hydrogen through the transverse arch of the colon, which combines immediately with the free oxygen within it, and aqueous fluid is the result. This will account for the duodenum not being wholly enveloped by a peritoneal covering; for the more ready diffusion of gases through its coats. When less or very little chyli-fication is to be performed in the duodenum, we can readily infer, that the bile would be then diluted by the pancreatic secretion becoming, like the bases of other salivary glands, more alkaline, when no digestion is going on in the stomach. And thus we see the beautiful order of Nature in its diluent laws; for bile in a highly concentrated state, having nothing to act upon, and still flowing more or less, would produce oftener than it does, those biliary actions which we often see; sometimes regurgitating into the stomach, and sometimes producing bilious diarrhœas. But if we find a proper check given to it; both by the pancreatic juice, as well as by the formation of aqueous matter from the union of oxygen and hydrogen, we at least see some philosophy which might lead us to say: Have we not hitherto taken too narrow a view of the great principles of life? The duty of the present age, is not simply to believe, or take for granted, what has been brought before it; but to penetrate yet deeper into the mysteries which surround us.

September 6, 1865. .

LETTER XVIII.

SIR,—From what I have said in my last letter it may be inferred, that I look upon the chyme and the chyle as far more important in their characters, than they have hitherto been considered. So soon are they both destined to perform vital functions; that they appear to me to be even in themselves incipiently vital. I do not think that we have sufficient reason for supposing them to be inanimate, when they actually appear to be endowed with almost a life of their own. Do we not call oxygen vital air? Do we not consider its first act in the lungs a vital one; equally with the calorification and decarbonisation of the blood? Why, then, are we to change our opinion, when analogous acts are going on in the stomach and duodenum? For vital elements are formed in both by two distinct processes, and which are so soon to float within the walls of blood vessels, bearing their revivifying elements for all the purposes of life. I do not think we ought to consider less of them, before they enter the circulation, than we do when they are actually within it. So lightly are the chylous elements held together in the duodenum, that if a small portion were removed therefrom and treated with acid, the chyle would again become chyme; and if this again were treated with alkali, it would return again to chyle. Why is this? Simply because the next process it has to go through, should be more easily performed. Unless it was in this delicate and beautiful chemico-vital condition, we should not have the results we all apparently believe we know so well. This already vital element flows through the duodenum,

being carefully expressed in every possible way. This expressiveness is from the conservative action of the organ itself; assisted by, and through, its anatomical character, as well as the physiological properties with which Nature has endowed it. Thus the chyle, full of free oxygen, seeks other gases for greater fluidity. All the fatty and oily masses being amalgamated with those, which the stomach alone could do, and which the duodenum could not; for it is not only its duty to saponify these, but to incorporate them with others. It is then charged with bubbling sparkling elements of air and water, and full of active life for the next stage. Well, let us ask where it goes to? The answer is: Into the small intestines. I have said in former letters that physiology is that science which consists of constantly asking questions. What, then, are the duties of the small intestines, and how do they perform them? We see an enormous number of folds tied together by a mesentery; so that the upper and lower ends are pretty close together,—all the rest is fan-shaped. Nevertheless, the whole seems pressed down in the centre of the abdomen, and covered over by the omentum and the transverse arch of the colon; and at either side, by the ascending and descending portions of that gut. One would suppose that there was not room for its action or duties. But this it does not want, in order to perform them properly. The very facts we see naturally lead us to suspect, that it is for some great design. They have not the free play of the stomach; nor should they in health have the distending character of the curvatures of the duodenum. We must constantly bear in mind how they are huddled and pressed together. What reason can we then give for this? Let

us try and find out. Now it would not do to have a long intestine, for instance, like the colon; so that it evidently differs in a most surprising manner from the two above and the one below it. If it was a tube of any other character than what it is; it would seem impossible for the lacteals to absorb the elements from the chyle, which passes into it. We must always keep in our minds the wonderful actions of osmose, and that there is no such thing as open vessels in the body. Months of absorbents are fallacies. Therefore, whatever is absorbed must be done by osmose, through membranous structures. When we view the living body as a whole, we find everything in apposition,—there is no vacuum or unoccupied space anywhere. We may grow fat or get thin; yet everything rises or falls to both actions. But we want to see *how* absorption of chyle can take place through the small intestines; and by what mechanical agency this can be assisted. Now, it can only be effected in one way—namely, by the sides of the small intestines approximating on their contents; and this occurs directly chyle enters into them. The term 'peristaltic,' which has been used for many years; does not appear to me to bear all the meaning of natural intentions which it really has. It is only vaguely expressed as 'a vermicular motion of the intestines, by which they contract and propel their contents.' Being a derivative from the Greek, meaning 'to contract,' physiologists simply wanted to account for a power of propelling one body out of another. This alone is not what Nature intended. She does not do things in this half-handed manner. She does not want, in this case, mere simple propulsion to get rid of anything. Therefore, as she is not acting entirely in

a conservative way in this viscus, she at the same time does not act too hastily. I have previously said, everyone seems satisfied with a basis for their mind to rest upon, to explain what it does not perfectly comprehend by law, logic, or philosophy. Now, directly the lightly held mass of chyle passes into the small intestines, a peristaltic action commences; that is, using its true derivative, a contraction of them takes place; not, however, to 'propel their contents alone!' No! there is a far higher and more useful power here exerted, and that is, a certain pressure is used in the contraction; and thus the 'nutritious' elements are forced through the porous membranes and are taken up by the lacteals; and what is passed on, is for other portions of the intestines to do the same with. This action resembling more that of the washerwoman's knuckles against the linen she has to cleanse; or that of a moderate millstone power. Of course, if this is continued gradually throughout all the convolutions; we see one of the most beautiful adaptations of a means to an end which we can possibly imagine; and, in fact, the only means by which abstraction of fluid elements can take place. What I have previously said of the mechanical laws of the absorbents, here finds judicious application—namely, that they are made to do their work, and are compelled to receive the elements they were destined to carry to given parts; even without the sucking, or absorbing, or vacuum powers they are supposed to possess. In certain distensions of these intestines from flatus; or the want of this contracting power in themselves, it is utterly impossible that the lacteals could act so well, or so perfectly, as they do. Therefore, great losses would naturally ensue to the system, by the passage of chyle

through them, without its nutritive properties being abstracted. Who, that has had much to do with infants and children, has not observed pure chylous stools, and all the nourishing elements passing out by the large intestines? Also, in many diseases where no amount of generous and nourishing diet has ever seemed to do the sufferer any good; simply because this important act of knneking and millstoning, has not been performed. Who, that has seen much post-mortem practice, has not beheld the small intestines blown out with flatus; the arteries *engorged*; the capillaries *injected*; the outside glazy, and the inside without a trace, or scarcely so, of chyle? Yet have seen the scalp carried to the heart, to the liver, to the kidneys, and many other organs: and, when the investigation has been completed, seen the scalp dug into various parts of the small intestines, to let out the flatus for the more easy replacement of these viscera? I have seen this often, and, with it, the post-mortem terminating in very unsatisfactory results. In fact, the small intestines have been ignored at the very time when they were the very seat of the disease—the cause of all the want of power witnessed during life—and which no skill could save. It was in vain that the labouring of the heart, and difficult respiration during life, was witnessed; or the dropsy in the body, with the huge legs like mill-posts, which had been punctured and scarified many times. Every organ had its full share of notice, and attention, and diagnosis—all save the small intestines. Now, when they get into this state in old chronic cases, there is no hope; and for want of that nourishment which they ought, in their only true, healthy condition, to have supplied to the whole body, by contact of their

sides and general contraction, and thus, forcing nourishing elements into the lacteals, the patient dies; and every imaginable disorder but the right one is given as a cause. Something is sure to be found to account for the general want of knowledge of the rightful causes. Here, then, is the true and full meaning of PERISTALTIC; not to propel the chyle through the intestines; but the nobler action of forcing virtues out of it, to nourish the whole system. What is not so done in the upper parts, is done in the lower. A tube cannot hold more than its fill. All the lacteals, therefore, become gradually satisfied, from first to last, as this beautiful process goes on. But then it may be said, that the far distant lacteals get a thicker and more viscid substance forced into them, as the mass gradually progresses through the gut, and the recrementitious matter becomes more developed. Not at all; here the same laws of the gases occur; for oxygen is still largely coming down with the chyle, and absorption of hydrogen becomes greater. Aqueous substances are, therefore, being formed, to mix with this remaining mass; independently of which, the large secretion of mucus from the mucous membrane, throughout its whole extent, assists and leavens the whole. As the ileum is reached, what do we see, and what do we find? Why, that fæcation in the first place becomes apparent, even before the mass enters the colon; and, secondly, that oxygen ceases to become an element there—hydrogen and its compounds being in excess.

September 13, 1865.

LETTER XIX.

SIR,—Physiology, which persists in saying, that the recrementitious and nutritious matters in the chyle, are separated in the duodenum, must, I think, be at fault. The operation of the small intestines, described in my last, must be either right or wrong. If it is wrong, and the present physiological belief right; then the small intestines, ought to have a double tube—one for the nutritious, and one for the recrementitious matters, separated, as they are said to be, in the duodenum; or, that the physiological actions of the small intestines, ought to be very different from what they are. But no one who thinks on this matter can really imagine this to be required; because the very anatomical structure of the small intestines forbids it. If a vague meaning has been given to the term ‘peristaltic,’ let one more in unison with natural laws be substituted. If I am right in the physiological laws I have propounded; then we can account for the structure of the small intestines being what they are, in shape and functions; and fully able to squeeze out from the whole homogeneous mass of chyle, all the nutritious matters it contains. The word ‘peristaltic,’ as I have now first used it, will serve us hereafter to explain other actions; and that it cannot be taken any more in the simple meaning hitherto given to it.

Now, what has given rise to the idea that chyle is separated in the duodenum? Why, a fallacy manufactured in the laboratory. Chyle, for instance, may have been abstracted; and, owing to the mass being

so lightly held by its own chemico-vital laws ; when it has stood for a time, a whitish milky substance has been noticed to swim to the surface ; and a yellowish pulp sink to the bottom—the milky substance being the least in quantity. This may be quite true when it is out of the body ; but both are inextricably mixed when in their own fluid and vital state within it ; precisely as the blood, when drawn, is seen after a time to separate into cruer and serum. As well may we say of this ; that it is the duty of the heart to separate these two properties of the blood ; when, in fact, the very function of the heart, as having two auricles and two ventricles, and the new-formed blood going into an auricle first, and then into a ventricle ; then to the lungs and back again to an auricle ; and then into a ventricle, and thence into the large vessels. All which processes would imply a provision to keep the whole mass well mixed and fluid ; and nothing, I think, can illustrate better the intention ; for without this reasonable philosophy, the heart might just as well have had only one cavity on each side, instead of two. Thus a provision seems to be made in the duodenum to do the same thing for the chyle—not to separate it into the masses, but to keep it in one. Mixed as the chyle is, it seems great wisdom that the nutritious matter separates easily from the recrementitious ; and it cannot be otherwise than apparent to me, that this latter mass must of itself contain much of the nutrition, which could not be got out of it in any other way, than by a passage through a tortuous intestine ; subject to the knuckling and millstone pressure throughout, which I described in my last ; and which wine-pressers simulate, to get all the vinous

elements and juice they can out of their grapes. To show the fallacy of the present doctrines; the best of our physiologists comes to this conclusion, *as per book*. Explaining how the duodenum separates the chyle, he says: 'I have just mentioned how the separation of the chyle is performed; but the mechanism of that separation, and the process of chylification, ARE ABSOLUTELY UNKNOWN.' To which I say: I most thoroughly agree with him; because neither he nor his commentators, nor later writers, have gone further than the merest supposition; and, having guessed at a fallacy, and thereby made a false basis for their reasoning; have not taken into consideration the anatomy or physiology of that intestine, into which the chyle, which they speak of, has to be manipulated upon, and the processes therein performed upon it. Hence all the errors, and all the darkness, in which this subject has been hitherto shrouded. Granted that there are many things we do not understand; yet know somehow, that they must take place. If we are satisfied with the law propounded to us, of the digestion in the stomach; which means nothing more nor less, than that everything taken into that viscus is completely disintegrated and made a creamy mass of; and containing, as a matter of course, elements of all the food or drink taken. Nevertheless, but always with this exception—namely, that they cannot for a moment remain what they were. The chemist may perform many experiments in his laboratory; but he has but few elements to operate with or upon. While taking the laboratory of the stomach, directly anything gets there; it brings at once a hundred elements into play, and in this act, reduces all things to a few simple ones.

These, amalgamated in their character of chyme, are again acted upon in a second laboratory by a totally different and opposite process. If we cannot work out these ourselves by our limited chemical manipulations, I do not think we should give up a fair philosophical deduction of them. We know, that fresh elements are deemed necessary for the waste going on. We know that the waste and the common destruction of all animal properties in the body must be something enormous; and we know that every provision is being made for many being used again. I have, therefore, given it as my firm conviction, that we make, in the way above described, four-fifths of our own vital nourishment; and all we want is one-fifth of the raw material to assist it. It must not, however, be lost sight of, that I wish to bring the gases of the body more prominently forward than has ever been done before. We cannot be insensible for one moment, of the extraordinary vitality of the atmosphere in this respect; it being the natural medium in which we live. What facts do we here see? Why, that whatever finds its way into it, never mind from what source, whether from trees, plants, herbage, or from animal substances, living or dead; there is a law which reduces it for the use of vegetation and animals to four-fifths nitrogen and one-fifth oxygen, with other almost immaterial substances. A similar law exists in ourselves; that whatever we take from air, earth, or water, solids or fluids—all are reduced to the few simple elements which make up our entirety, our life. So that when these elements have lost a certain vitality, or unison of action known under this term; other laws commence, reducing everything to a mere nothing.

For what is that handful of earthy matter, which the best and greatest amongst us must one day present, as all that remained of him?

I have spoken of the stomach as not being by any means a conservative organ; I have spoken of the duodenum as being partially one. The small intestines are only so in a very moderate degree; and that by reason of their anatomical formation and their functional duties. In their commencement, they have lacteals freely supplied to them; at parts, as they descend, these are sometimes scarce; then they appear again more freely; as if the intermediate parts had given time to the chylous mass to recuperate fluid elements, in order to mix and remash again the recrementitious elements more thoroughly; lest nourishing matter, still lurking therein, might pass off unabsorbed. Then, as it progresses towards the ileum, and less and less oxygen is present, they become sparse and almost absent. We must here admit this to be a wise law; simply because, in the lower part of the ileum, very little or no oxygen at all is found; and the recrementitious matter is about to pass into a viscus, where there is none at all.

In reviewing the passage of the chyle, when in full quantity, through the small intestines; we must not forget that the gases are still playing a most important part. The oxygen comes down direct into them, while their activity is great in pressing all fluid matter of a nutritious character out of the general mass, into the lacteals; by which action they are compelled to perform their incessant and regular duties.

Here, again, we see an useful action, which has never been sufficiently noticed, resembling that of the

stomach, which I have described, in a former letter, as made to do its own work of crushing, and so keeping its muscular powers in proper working condition. The muscular powers of the small intestines do the same. They are not left in the passive state physiologists would infer that they are, if the duodenum separated the recrementitious from the nutritious portions of the chyle. Neither would the small intestines have that healthy muscular character they are seen to possess, if they were of the exceedingly passive character necessarily inferred by those, who hold the present fallacious belief, that they simply absorb the nutritious matter of the chyle; separated by some imaginary process into two parts, by the bile in the duodenum. In this state, they would indeed be very poor working organs; whereas they have muscular duties to do which keep them healthy and tonic in their action. If it was not for this, I question if much nutritious matter would ever get into the system; and, if the present dogmas were right, I do not see the necessity for the small intestines to be supplied with any muscular apparatus at all. Therefore, their presence would be a work of supererogation; and Nature unwittingly wrong in placing them there. No one can disbelieve, that where there are muscles, whose fibres are so arranged, that they were given for power; or to exert power in some way. And that, wherever they are present, it must follow, that any attempted philosophy that seeks to ignore them, and say they are useless, must be false; and I here repeat that the muscular apparatus of the small intestines, must be employed in the way I have described on their contents. They are therefore wary, as well as diligent, in

all their duties, and do not propel any matter through them, until they have got everything that is good out of it.

The same law of osmose pertains to the gases they contain. These are also squeezed through their porous coats; for it must never be forgotten, that there are other parts requiring them, and which could only get them in sufficient quantities in this way. There are membranes and fat to be provided for; and these are always ready to receive elements for their nutrition. And what oxygen is not absorbed by endosmose through the pores of the outer body, exposed as it is directly to the atmosphere, may at least be obtained through the mouth by aid of the ingesta and drink which is swallowed; for it is not at all times absorbed or used by the hydrogens. Thus, when those enormous meals are made by some men; there is a regulating power to carry off at once into the colon, much nourishing matter; even when their laeteals have taken up more than is wanted by the system; and hence it is, that excess of fat is deposited within and on the outside of many organs and muscles. Thus, then, we see a wonderful process going on from the mere exosmose of gases, at the most active functional time of the small intestines. On the other hand, when they are empty, or have little or nothing to do, the opposite action of endosmose takes place; and gases are then absorbed by them; and if it were not for this and the trickling down of elements from the stomach through the duodenum, to keep up a passive muscular action; there would accrue that probability which Nature has always bountifully provided against—namely, of the tube being rendered imperfect. Hence it is, that long

fasts can be endured;—hence it is that even existence can be prolonged on very little nourishment;—hence it is that Nature is always wise; and when we expand our minds to understand her, we every day find out how very little we really know.

September 20, 1865.

LETTER XX.

SIR,—A correspondent says I did not explain the tetanic symptoms of his cases of cholera of August 23. I thought I had done so. I wish, however, now to correct a few errors he has fallen into. It seems I called his cases '*erratic cholera*'—that is, a bastard sort of this disease, and not the true type; and afterwards styling them '*a disease simulating cholera*.' He says: 'Why say it resembles, when first he said *it was cholera*?' He will see that I said no such thing—*erratic* and *simulating* being two words expressive of the same meaning. Then speaking of the shock to the solar plexus, I said: 'It is from this centre of the nerves that spasmodic cramps arise in true Asiatic cholera.' Your correspondent makes me say, in the next line but one, that these spasms *only* arise in true Asiatic cholera. His own correct quotation of my observation proves, that I did not use the word *only* at all; for this reason—cramps like these may arise after an aggravated diarrhoea; or after much flooding in labours; or from loss of blood in menorrhagia; or from a severe mental shock, &c., &c.; proving that I know they are not confined to Asiatic cholera, and that I could not mean for a moment they *only* happened in

this disease; but being more severe and more marked in Asiatic cholera, I drew attention to the fact. His other observations on this point, he will see, necessarily fall to the ground.

Again, with regard to the application of the term 'hyperæmia,' the meaning of which is understood differently by different persons. I think it was a French physiologist who used it to imply a congestion of blood in a part; from whatever cause. Therefore, a clot of blood on the brain—an engorged state of blood in any collection of arteries—a congestion of blood in any set of veins, such as hæmorrhoids—an infiltration of blood in the capillaries, such as bloodshot eyes, or conjunctivitis—all would imply hyperæmia. Whereas, it is applied by others to denote any extra sensitiveness of the skin, or any other part. Therefore, until our Medical nomenclature is more defined, it is not possible to understand it. But supposing it to be present; one of two circumstances must happen. If the French physiologist's definition be correct; what does a hyperæmia produce on the part? Would it be obstructive to the electric action of the nerves, or would it excite their electric currents? A clot of blood on the brain, or a hyperæmia there, is evidently obstructive to the due performance of its functions. If, on 'the spinal and sympathetic nervous centres,' whereby, I suppose, is meant either semilunar plexus, or both—namely, the solar plexus; does the same fact occur as if it was on the brain? I am inclined to take this view. If so, we can account for tetanic actions—namely, from arrest of electric currents which produces them; showing that the telegraphic wires or nerves are affected according to the pressure exercised upon them, and the correct or incorrect state

of the batteries which influence them. But, on the other hand; if hyperæmia in any part produces excessive sensitiveness, then electric actions are inordinately excited, and pains are necessarily great and continuous. Then, again, some physiologists say that anæmia is the cause of pain along the nerves, while others attribute it to hyperæmia. So that, taking all these things together, any man who is in search of the truth gets bewildered, not only with terms, but with dogmas. No wonder that physiology requires a close attention paid to it; not only to sift the meaning of its terms, but to explain many of the actions of the body. Taking the meaning of 'hyperæmia of the spinal and sympathetic nervous centres' as an explanation of 'the tetanus,' 'the cord-like feeling across the chest,' 'the feeling as if cold water was running down the spine,' and the fact of rice-water stools being 'cold as ice' when passed; would then imply, arrested electric currents in the 'spinal and sympathetic nervous centres,' which a consequent deficiency of caloric had produced. This reading of the fact I believe to be as correct as any other. But then, as I have said in one of my earliest letters, that the nerves are only wires, and that the batteries make the electric aura; or that certain combinations of elements which, in the performance of their duties, produce heat. We must conclude, then, that these batteries were stopped by a hyperæmia; and not only was all electric action stopped at the same time, but heat also. Hence the 'tetanus,' 'the cord-like feeling across the chest,' 'the feeling of cold water down the spine,' and the rice-water stools being 'cold as ice.' All produced by a temporary paralysis of nerve batteries. Can this hyperæmia be explained in any other

way? As it stands by itself, it carries no explanation whatever. But, on the other hand, what was the cause of the hyperæmia? Was the course of the blood suddenly arrested in the 'spinal and sympathetic nervous centres,' or solar plexus? I should say nay to this; because the rapidity with which the cases recovered, rather forbids this view of the matter, and as your correspondent wishes these symptoms explained, and not the cholera, I thought I had done so by referring the cause to the destruction of electric-battery action in the solar plexus, the necessary result of which was, many of the symptoms in his two cases of '*erratic*' or '*simulated* cholera.' In giving my view of the treatment, I am sure your correspondent ought to be satisfied with my explanation of the action of his drugs and other remedies. I observed that, 'to stop pain, arrest the fluxes, and restore the electric actions,' are what true science is called upon to do, and which, he says, were 'the very objects he had in view.' I am glad of it, and hope these facts will be spread far and wide. I observed also that these cases of '*erratic*' or '*simulated* cholera' were frequent; whereat, he says, 'which God forbid,' yet at the conclusion of his letter, he says he has had '*five more, but none so severe*.' Therefore, he had seven, and I know many Medical friends who have had as many or more; none arriving at the dignity of true cholera; and I, myself, have had many cases during the last six weeks of the same *erratic character*, some of which have been congestive or acid. But as it so happens, the majority of mine have been inflammatory, showing want of the acid elements in the system, and have been treated with the acids, anodynes, and opiates; instead of the alkalies, anodynes, and opiates, with very

marked and good results. Your correspondent is inclined to treat this great distinction lightly; but I may simply, in illustration of this, mention the difference between bronchial congestion and bronchitis. In the former, the bronchial tubes are loaded with mucus, the pulse full, the skin moist and perspirable, with all the other characteristic conditions of a *congestive state*. The remedies are the alkalies and their carbonates; stimulating expectorants and good generous diet; plenty of fresh air, and everything done to promote the cough, in order to get the great mucous enemy out of the camp. On the other hand; bronchitis is an inflammation of the bronchial tubes. There is little or no mucous secretion on them; they are, in fact, bare of this secretion; not even having at times their proper diphtherite covering; the pulse is sharp and wiry; the skin hot and dry, with other characteristics of the feverish state produced by inflammatory action. The cough is hard; because there is little or nothing to come up; caused by the mere irritation of air impinging on raw surfaces. The remedies are acids and opiates—the very opposites; in order to stop the coughing, which you dare not do with impunity in the other state, bland drinks, low diet, and as perfect freedom from the air as possible. These observations may be suggestive in cases of great diarrhoeas, ‘simulating cholera.’ But your correspondent asks, ‘Are the two forms of cholera to be discriminated by testing the *excreta*?’ If he has no other means of diagnosis, he can do this, and may learn much by them. I have!

Your correspondent asks me to enlighten my Medical brethren by giving the symptoms of each; as, ‘if they are distinct types they must have different symp

tons.' Now, there are many symptoms in both these forms of cholera much alike; but it is only the careful observer of all facts who finds out and discriminates between the two. The same being necessary in other diseases: whether they be gout, rheumatism, fever, &c. Disease is produced by a morbid or altered condition of the secretions generally, and must be cured through them; but as long as this fact is ignored, so long will disease of any character have its ever-varying forms of treatment, and which, to say the best of them, is only treating a NAME, and not a CAUSE. New ideas which would promote better principles, are always somewhat sneered at. All new thoughts are very difficult even to be introduced, and men forget, in the after usefulness of them, how much they were condemned at first.

In our own day, gas, steam, vaccination, and railroads; all had their clever and apparently worldly-wise scoffers. Where are they now?

Your correspondent seems a little offended at my using the term '*empirically*.' I did so because the practice of medicine is yet but an *art and mystery*, NOT a *science*. If he were to have a run round the London hospitals this next season; he would see the same apparent disease not only treated differently in each, but differently by every physician. Not only this—he would hear the practice of medicine differently taught at each hospital, and hear the most opposite opinions.

Now, most men believe they practise *scientifically*. The few who know most about the practice of medicine, shake their heads and regret they cannot. Each man prescribes to the best of his ability, but never with

certainly. All may say, 'Experientia docet;' and as every man's experience guides him, and as all differ, then I use the term 'empirically' for all. Your correspondent's prescriptions were ordinary compositions (none the worse for that, by the way), and they did good. Twenty other men would, perhaps, have each given something different, according to their notions. Let him read in the Medical journals the different treatment of cholera, and he will see that I am right in what I say; and that every man thinks he is right in what he does. I wished to state the probable manner in which your correspondent's treatment accomplished a good result, in order that in some cases, where the same treatment may be adopted and failed, a watchful man like him would be induced to observe more closely the few hints I have thrown out; and prescribe according to the morbid condition or state of the secretions; not for a mere name, because it is diarrhœa, 'simulating cholera,' or even a cholera itself. There is a physiological dogma much believed in, and that is, that in cholera 'a great deal of the watery part of the blood is eliminated and passed off by the vomiting and purging.' I do not think this tenable. If we take the two distinct currents of the blood in health, and see how regularly they keep up a given standard; and are revived by new ingesta through the lacteals, as well as by fresh elements from the body itself, through the lymphatics; we can then imagine, that if a sudden stop takes place in all these phenomena, by a rapid evacuation of the contents of the whole alimentary canal, that many of the revivifying elements are at once lost to the blood. The heart's action still goes on; but every pulsation exhausts what blood

there is in the body; and every hour the goodness of that store is gradually reduced. For instance, what have the lacteals to take up? Nothing! For the whole alimentary canal is in an active state of endosmose; and whatever enters into it, is immediately carried away. What have the lymphatics to do? Why, just as little; for if there are not elements sufficient for battery-power to the nerves, there are no superfluous ones for them to carry off. I do not, therefore, think it requires any emptying of the blood-vessels, in the way physiologists have thus set forth. In fact, sudden death would occur if it were so; and if it did not, there would be very few recoveries. It is quite enough for them to bear the non-restoration of their elements; without taking away from them what they have; which is hourly getting less, by the simple act of want of new supplies. This I believe to be a new idea on the subject, and opposed to current doctrines, which I am not bound to pin my faith upon; though I am equally bound, as a physiologist, to state what I believe more approximates to the truth. Therefore, I said the blood had nothing whatever to do with this disease; and I do not believe for a moment that cholera is produced by any morbid poison therein. The purple colour which the body assumes, can be better accounted for on the principle I have laid down. For when the arterial supply is exhausted, and no new elements can be obtained; the venous blood must yet be exhausted before vitality ceases; and this being gradually done, what there is left becomes ill-oxydised and ill-decarbonised in the lungs, from the absence of the natural heat of the body and other causes. For it does not follow, that the blue or purple state is alone a

sequence of cholera, as it is often seen in other diseases as well; and I could cite some extraordinary cases of this kind.

September 27, 1865.

LETTER XXI.

SIR,—What do we know of the colon, called *par excellence* the large intestine? If we regarded it from the point of view of the general practice of Medicine; or the ideas prevalent on its treatment by the public themselves; we should say that it was an organ simply provided by Nature to receive that portion of the ingesta which, being of a solid consistence, could not be absorbed into the system, and therefore placed out of the way in this receptacle; Nature dictating the removal of it. Now, this law has been considered by the Faculty very imperatively, and that the contents of every man, woman, and child's colon should be emptied at least once in every twenty-four hours. The very idea of the contents of the colon being useful to the body, seems never for a moment to have been thought of. Indeed, so far from this has the imagination strayed, that the fæces have even been considered such poisonous elements in the system, that it is believed to be the bounden duty of every man, who is considered at all eligible to practise his profession, that he should at all times attend to this viscus first. He, therefore, has always been considered the wisest and best practitioner, who acted on the plan of 'clearing the ports,' 'attending to the primæ viæ,' 'purging the liver and bowels well,' as the very first step in all cases in which he was

called in; and then finding out where disease was lurking in the body. Having done this essential and necessary act; and seeing that no poisonous fæces or substantial elements existed in any part of the alimentary canal, the coast was said to be clear. For, to use one of their similes; if this was not done, ‘we should be putting a clean carpet on a dirty room.’ Nothing could resist such an appeal to the apparent truth so patent to everybody. In this, everybody seems to agree; and in fact the majority of the public hardly imagine, that any good is done by medicine unless it acts upon the bowels. Therefore, medicine has more or less been directed to this great end. At certain times in every year there is always some alarm about cholera. The daily journals, the Medical journals, the Privy Council and Ministers, the Boards of Health and Sewage, all agree, that when the fear prevails of this dreaded disease, that it is incumbent on all to set their houses and premises in order; to get good air, ventilation, and drainage, and, in fact, disseminate the fear they feel themselves, amongst all classes. That unless some outward and visible thing is done, this plague will be amongst them; just as nurses alarm naughty children with the cry of ‘Old Bogy’s coming;’ and other fictions as a means to an end. What, then, are all so much afraid of? What is this terrible thing which seems to make men’s hearts sink within them? Is it relaxed bowels? Not at all! Is it diarrhœa? Oh, no! It is one step farther than these; it is an aggravated relaxed bowels, added to aggravated diarrhœa from some inexplicable cause. But why be so frightened about this? One would have supposed, that the English community at least, were accustomed to

this; because from time immemorial, not only the Faculty, but they themselves, have been for ever making an artificial cholera in everybody, by the free use of aperient and laxative medicines. Surely after all these years, when we have been so accustomed to use purges on every occasion, and well know, that if we did not do this ourselves, directly we sent for a doctor that he would; surely we ought not to be so frightened at a spontaneous act, even when a little aggravated, when we are always doing it ourselves in some degree. We ought at all events to be so used to it, that we might rather say, ‘ Oh ! for a good diarrhœa ! Oh ! for a good cholera ! to clear us out well, and save the taking of filthy and nauseous drugs ; clearing the house of all dreadful and offensive matter ; making all its rooms clean and sweet, in order that we may lay down this new carpet, and fresh paper the walls, paint, whitewash, and generally amend the great house of life. So that, as our own drastics are used on the one hand artificially, upon the received authority and dogmas of the Faculty as a body ; we ought to feel indebted to Nature, who, through some of her inscrutable laws, sets up the same *modus medendi*, and sweeps everything clean out of us. But if the Faculty have done this for many centuries, and considered it right by every book and dogma ; then I begin to consider that Nature herself has been very wrong ; in fact, that she has been nothing but a bungler, and made a most unwise arrangement of the colon. When she made the first receptacle for fæces, the cæcum—so near the anus ; why not have made a short cut thereto at once, and as fast as feculent matter was deposited, to have got rid of it ? She could have made it under the influence of our will, the same as she

has done the bladder. If the fæces are poisonous substances, which in truth to say they are, why did she adopt the plan she has, and make a gut, a sink, and a cesspool to go all round the abdomen, at the risk of poisoning the very body she has taken so much pains to make so beautiful? It is very evident, then, that either man is right and Nature wrong; or Nature is right and man exceedingly unwise in not finding out what her intentions were; and after all these years of physicking and purging, most culpable as well as ignorant. Having said this much, and agreeing entirely with Nature, I have something to say of her wisdom and her great bounty in all she has done. Anatomists and physiologists have really done their duty in many respects. They have given a most fair and just account of what they have discovered; but the fault lies deeper than we are aware of. The anatomists have shown the shape, position, and character of this intestine; that it commences at the cæcum, and whenever anything gets there, certain valves close it, so that there is no retracing of its steps; it is for ever shut out of that part of the body from whence it came. Directly it gets there, if the colon could speak and why not? Many writers have made animals and reptiles speak; why should I not give a voice to the colon and fæces? Well, then, the cæcum says to its first comers, 'You have been in a desperate hurry to get here.' 'Yes, I have,' say the fæces, 'but I am very different to what I was when I first went into the mouth; I am somehow mixed up with everything I came into contact with; the usage I got in the stomach was something fearful; my character was literally destroyed, and I was mashed up and sent about my business as quickly as possible;

then I was seized by another stomach and all the sourness taken out of me, while all my oil and grease were saponified and then mixed with all the rest. I was detained a little there, but soon expelled; then I got squeezed and pressed through a long tunnel with no end of turnings, and with all the juice taken out of me, I was hurried on here; and so, I suppose, I must be served the same way now.' 'Not at all,' says the cæcum; 'you have been hitherto in one confused state of bustle: policemen everywhere to order you to move on; but you will find policemen here to arrest you at every step—indeed, you can't move of yourself. Do you see that hill before you?' 'Yes,' say the fæces, 'how am I to get up that?' 'You will have to wait until you are pushed up by another, and the next by another, and so on; so that there is now an impediment offered in every way to your progress.' 'But,' say the fæces, 'I am become a poisonous mass, once so sweet, and savoury, and appetising. I am, by dint of the processes I have gone through, become so perfectly disgusting, that my very aroma is positively unbearable, and my exhalations are more poisonous than my whole bulk; so much so, that I should have thought you would have been glad to get rid of me as quickly as possible, instead of detaining me.' 'There is a great difference of opinion on this subject amongst the Faculty,' replies the cæcum; 'the majority have always thought as you do, and the great end of medication seems to have been directed to your expulsion.'

Now, it is a curious fact, that in every generation this subject crops up, and demands a thought to be bestowed upon it. A great writer on 'Ulcération of the Stomach' was averse to giving aperients in

fevers. Another, in his pharmacologia, says:—‘Did it never occur to the pathologist that Nature may upon some occasions wisely retard that operation which he is so anxious to provoke?’ In fact, many physicians, relying on their *experience* as they get older, have abstained, to a great extent, from giving cathartics. There have also been sound-thinking general practitioners, who have come to the same conclusions. But ask them, as I have many, their reasons, and you will probably get the same answer as I have—namely, ‘My experience pointed it out to me; I have no philosophy.’ Here is the old story, *experientia docet*. In fact, they have all only been empirically correct. So that this treatment having been adopted more or less almost everywhere, by all classes of practitioners in every generation; shows that it is nothing new, but yet having a great deal in it. If at any time, certain of the Faculty have been bold enough to record their opinions in some Medical journal, by way of ventilating the subject; it has probably been coupled with the treatment of some case wherein they wished to enlighten their professional brethren.

Thus, then, it may be said to have simply ended there; for ten to one if any of their readers would meet with a similar case to try the new idea upon. Precisely as we see now-a-days, cases recorded in either private or hospital practice; or read before some Medical society, of some vagaries of the secretions producing certain curious symptoms or diseases, with the author’s treatment and its results. Well, what is learnt by them? There is never any philosophy given, and no point of physiology elucidated; and when they have been duly read or listened to; what does anyone

know about it, and who is the wiser? They have carried no conviction, and no new fact has been impressed upon the mind. This shows the importance of some philosophy being attached to all these proceedings, for any good or any truth to be substantiated, or engrafted on the mind. Certain authors have left only their own opinions; the same as other men have done, with no philosophy at all for what they did. No doubt all these men believed they acted *sua sponte* on all such occasions; and each, that it was his own peculiar idea; because it was the exception to a very general rule. 'As from the shaft no trace is found; no scar the sky retains; no furrow from the keel;' so likewise does all this cropping up of Medical treatment by experience without philosophy or physiology die away, and leave no trace behind; no impression, and no beacon for others to steer by.

For my own part, I look in vain as every hospital session comes round; for some one to step out of the dull tame routine and groove in which the practice of medicine travels and seems destined to travel; without thought beyond the current belief of the day, or any genius for the future.

I see, by the way, that a physician has ventilated the subject of aperients at the British Association, pretty similarly to many who have gone before him. As his ideas, therefore, are the latest, and may no doubt be considered by many, a fair exposition of present views; it will be worth while to see if they hold water and bear the test of criticism; in order that he may get all he deserves for bringing them forward. I will endeavour to do this in my next letter.

October 4, 1865.

LETTER XXII.

SIR,—‘Not a few persons still look upon purgatives as necessities of life;’ ‘they seem to think that the bowels would never act without the customary pill or potion.’ This maxim has almost become a creed with many, and having been encouraged by the Faculty, the one cannot be called more ignorant than the other. I do not wonder if ‘they stare incredulously when they are told that constipation is the natural result of some error of diet.’ I should do the same, for I ask, what is this ‘error.’ Bowels habitually constipated with advantage in some persons, may require very opposite medical treatment; for what would suit one, would not suit another. It then resolves itself into the treatment of each case according to its idiosyncrasy; and each case must always have its physician of the same way of thinking; and the whole process gone through of dieting, to find out what agrees and what does not, in order to get these obstinate bowels into some degree of regularity by diet and not physic. Now all this involves such a cumbrous machinery, with all its delicate processes, with the doctor always at hand, at a certain expense; which everybody cannot afford. Besides, the rectification of some of Nature’s doings, would seem to imply, that life was scarcely worth having, if all this trouble was necessary to produce what is called a certain amount of health in the individual. On the one hand, there would be many things which the individual would like, which he would be forbidden to take; and many things ordered him which he would neither relish nor like. So that, in one way or other, he would really be like our old friend

in the island of Ballataria. Again, I never knew a dietician a healthy person: first, because he seldom repairs according to his waste; and, secondly, debars himself from certain things which would, perhaps, in their ultimate reduction, produce valuable elements in his system, and just what the system required. Therefore, it is not at all consonant to Nature's laws, that dieting is the rational plan of treatment; because I will show hereafter, that constipation depends more on the value of the fæces than the food; and that it does not much matter what food is taken, so long as plenty of fæces are the result. On the other hand, 'constipation is in some cases rather to be encouraged than to be corrected,' shows at least an effort of an observing mind to grasp a reason, even if it fails to show a true cause. It is said that 'man is an omnivorous animal; originally it was not so.' Now this latter is quite gratuitous; for it seems to imply, that man, in his original state, was a superior Life-Guardsman sort of fellow; handsome and well-formed in body and mind; ready made from the earth to give laws to the universe, and names to everything; and his wife, as beautiful as anything that Belgravia ever turned out on a bridal morning; barring the 'leather and prunella,'—both of whom were presumed to live on the best of fruits and vegetables. For my own part; my ideas of the first man set upon the earth (as only the Creator Himself knows) must have been like any other savage we even now see in uncivilised countries; and that he, in his human and omnivorous nature, preferred the killing of animals to support his peculiar organisation, rather than be content to live on vegetables. It seems to me derogatory to science, as well as to that mind which

Providence himself gave man, in order that he should be above all other animals, and which, in all ages, man himself has so cultivated as to understand the great laws and the wonders of the creation. For, in this fact alone, herbs and seeds might mean meat and food in the general acceptation of the term, and to include flesh, and therefore herbs along with the fresh-killed animals, was no doubt the fact of the matter; as everything that was made, was made subject to man's necessities. It is well known that all savages are necessarily hunters, and require larger tracks in proportion to live upon, than those who afterwards emerge from that state, and become agriculturists and storers of grain. Man is the same animal now as he was at first, and no doubt got his '*meat*,' as savages do now, wherever he could on the face of the earth; according to the physiological laws implanted in him by his Maker. A physician introduces the question of eating 'too much animal food and too little green meat,' and the consequence on the bowels. He then illustrates the case of the Cow and the Lion—the one living upon grass and having a semi-fluid motion every hour; the other gorging on flesh wherever he can get it, and not having a motion more than once a month. We might say, what a pity he did not eat straw like the ox; which in some happy future time he is to do; but then, like my other proposition, what becomes of the wise laws of the Creator which never alter, and in whom there is no change or shadow of turning? Truth is truth from the beginning to the end. It is this fact which enables men to whom He has given minds and intellects, to find them out, and unless they always were the same, man could never know anything at all; there would be no fixed points;

everything would elude him ; whereas, he knows what he does, from the sheer stability of all natural laws. The cow illustration is not a very happy one ; for how is it with her husband, the bull, who lives along with her on the same grass, and he has few motions a day, and those rather solid ? How is it with the sheep and deer, and the goat, who all have seybalous motions ; the very opposite of the cow ? Take horses out at grass, if they are in health, their motions are consistent and not too frequent. How is it that in many persons who eschew much meat and live principally on vegetables ; and those who have become entirely what are called vegetarians, that they are not free from constipation ? Take those who consume, on the contrary, more meat in proportion to vegetables ; they are often very loose fellows in their bowels, while those who mix both are sometimes costive, sometimes loose.

I take myself a fair proportion of both meat and vegetables, and being in good and robust health, am what may be justly called a very regular man. But if in the spring I eat largely of currants, strawberries, raspberries, cherries, and all these early fruits, I become costive ; and the more I eat, the more costive I am. This autumn I have eaten largely of peaches, nectarines, plums, greengages, pears, &c. ; the same fact occurred, and instead of taking physic, I take some good hard Sussex puddings ; made of nothing but flour and water ; which when cold would be no bad substitute for the ball eartridge of a small howitzer, in the absence of one of iron. These cause me to have proper alvine actions. In other persons the very reverse might happen. Take the peculiar diet of counties and different nations, and it will be found, that neither con-

stipation nor looseness depend on the food. Nor as man 'departs from the state of the lion to that of the cow,' does the physiological phenomena of the state of the stools depend. If we are to prefer the *secundum naturam* to the *secundum artem*, let us go a little deeper into the matter than we have hitherto done; and we may find out something which will explain all these facts better. In the artificial state man lives in, many theories have been propounded by empiricism on the treatment of his disorders. Let the individual feed on anything he pleases, even as a carnivora or a vegetarian; or on the mixed diet, constipation may occur; and this is not to be cured by aperients, but it may be by tonics. Constipation is often a state to be encouraged, for it is a conservative action. This has been observed, especially in 'old age and debility.' Now, I have known old Medical men and physicians of reputation who have hugged their dogmas to the last; complaining that their bowels did not act so regularly as formerly, and fly to their dinner pills and confection of senna; and then wonder they lose brain power and their memories. Physicians say, in these stages of life, that 'it may be assumed that the digestive powers are feeble.' Now, many old people in this state, though they have lost most of their teeth, can and do take an enormous amount of food, animal as well as vegetable; while their digestion is most vigorous, for they seem always ready for their meals, and get querulous if delay occurs; showing that this constipation with them does not depend on their food. Then, to make those whose idiosyncrasy is constipation have a daily motion, 'after the manner of many,' 'must have the effect of starving the system, by removing the food from the

bowel, before digestion and absorption have had time to do their work.' Now here is some confusion. If chyle is meant, and this is removed too quickly from the small intestines and carried into the colon, and the fæces, consequently, too quickly and inordinately purged out of the large intestine, then there is a double loss, and I can understand the case; but the food is only mentioned, which has nothing whatever to do with the action of the fæces in the colon. The physiology of these are so entirely different, that I see plainly where all the errors arise in all these questions. However, a physician has broached the subject in the old and usual style, and pursued the same beaten track; looking only to the food and its digestion, without a thought of the physiology of the colon itself, or the uses of the fæces and their influence on the general system. The value of the fæces being apparently not understood at all; and the colon, which is one of the most intelligent, if I may use the term, of the whole viscera, as well as the greatest conservative organ we have in the body, has not been understood. These are questions of such mighty import, and capable of being explained far differently than they have hitherto been; that in following up this subject I hope to throw some new light upon it.

October 11, 1865.

LETTER XXIII.

SIR,—That hundreds of men should have observed in every generation, for as many years, the peculiar constipated habit of some families and individuals, and never treated it as anything but an irregular and morbid condition, to be corrected and brought into one more consonant to general belief;—is something startling. That in many of the ills and accidents to which the human frame is liable, the first thing Nature does is to cause constipation, and so conserve the elements of the colon. That these facts have never been sifted or inquired into, seem to show an utter disbelief, that any benefit can accrue therefrom, or, indeed, quite the reverse, and that Nature was wrong, and consequently ignorant of her own operations. Certain it is, that the conservatism of constipation is never considered in the light of a *vis medicatrix Naturæ*. It is quite a new doctrine to say, that all this time this very act of hers was one of her prime movements of health. For instance, throughout the whole class of milliners' girls, a constipated habit prevails. Some of these young women eat only vegetables or bread and butter; some only meat; and in this, some only like it well done and even burnt up; while others of more cadaverous complexions like it underdone and almost raw. They are, as a class, most capricious in their feeding; their bowels are only open about once a week or ten days, some a fortnight or more; yet they go on pretty regularly in their duties. If they take aperients, they are always worse after them; and if they can afford to go to a doctor, and have the eternal blue pill for their

livers and cathartics for their bowels; they soon begin to waste and drop by easy stages into consumption. It is the most fortunate thing in the world for them, that they cannot afford to pay medical bills or fees. Yet they have their own sense in all this, and will tell you, they are never better than when their bowels are confined, and always that they are worse after aperients. In fact, their bodily health rests on their being poor in pocket and conservative in their bowels. In the narrative of the mutiny of the *Bounty*; when eighteen men were cast adrift in an open boat; it is recorded that for above a fortnight or three weeks, the whole crew were constipated, and that they did not appear any the worse for it. Certainly not! it saved them. But if there had been a doctor on board with any aperients; he would no doubt have given them, and not one would have been saved. Yet physiology never took up this subject, nor ever learnt anything by it. A gentleman told me that once on a ride across the Andes, which lasted above a fortnight, his bowels were not opened at all. He often wondered at it; but I explained to him the reason, and he then felt, that this natural law saved his life: and no doubt it did. In the incubation of birds, this fact obtains to a great extent; and the great heat that is engendered from their bodies serves the end in view; but a common hen sitting with loose bowels, will bring no eggs forward. Having insufficient heat for the purpose, her labour is all lost. In the hibernating animals, a two, three, or four months' constipation is a regular thing. This is well known to the bear-hunters; and if the she-bear loses her fæces, which the hunters call the 'tappen;' she loses her caloric and strength,

and she fails in the maternal end she has in view. I could bring forward many facts of the same kind, to show the benefit of the conservatism of constipation in the healthy and normal state; but these are sufficient for the present. In the opposite states, such as in fevers; the very first thing Nature does is to lock up the bowels. In severe falls, where the body gets shaken to its very centres, she does the same. In many diseases also, besides fevers, she acts in the same manner. Even in diseases and certain affections which man himself produces in the human system to relieve others; such as, in many surgical operations, which more or less affect the whole condition of the system and its secretions; the first thing Nature does is to conserve the fæces. Notwithstanding all these glaring facts, neither physicians nor surgeons will allow it. A fixed prejudice on this matter still holds with every man, however high his position in the profession. I went some few years ago to witness some beautiful operations for recto- and vesico-vaginal fistulæ. An operation was performed that day on a young governess for fibrous enlargement of the womb, and which was removed, and weighed about twenty pounds. I told the operator when all was over, that he would lose his case, and he did; because he did not understand the physiology of the colon. He thought this very hard; but I asked him how long he intended to keep the bowels confined; his reply was, 'For three or four days, perhaps.' I answered, 'Why not make it weeks?' Now this gentleman did not turn upon his heel, or think me somewhat insane, but asked me the reason; for, as he justly observed, 'You do not tell me this without one.' I did so, and went several

times afterwards, and found my advice had been followed. The sequel was, that in the latter part of the year 1862, he called upon me, and said he had had many foreign professors that year to see his operations. But he emphatically said : ‘ My operations have not surprised them half so much as my medical treatment, and they were all astonished at my conservancy of the patient’s bowels for any length of time I wished.’ The consequence of his pursuing this practice has considerably reduced the death-rate after these Cæsarean operations.

Now, although surgery now-a-days leaves nothing to be desired ; the successful issue of operations often depends upon the after medical treatment ; and this was fully admitted by the surgeon above alluded to, who gave me all the credit. If this was done oftener in our schools, even as an *empiricism*, the success surgeons would meet with would surprise them. I wish to take the question out of the region of empiricism, and place all these wonderful laws on a scientific basis, on which alone it can firmly stand. It is therefore incumbent on the physiologist to find out, why this fact is beneficial in many idiosyncrasies in health ; and why it often checks disease and gradually assists the secretions towards a condition of health. What, then, may we ask, is the reason of the natural constipation of those who have this state in health ? Why is it that in given conditions in the system, from persons being placed in some greatly altered circumstances, that constipation becomes a beneficial action, when the reverse always occurred before ? Why also in disease should this fact come to their immediate assistance as a *vis medicatrix Naturæ* ? Why, under

many circumstances of violence done to the system is it, that this fact is a sequitur? Even in the health of other individuals, with the greatest regularity of the actions of the bowels; we have to ask, how much of this depends upon the colon? In short, we have to learn as much philosophy from what may be called the opposite conditions of the colon, as we have of its regular actions and the organ itself. We have to ask ourselves how much the principles of life depend upon the physiology of the colon, and the usefulness of its contents, and come at once to this point:—Are the fæces useful of themselves as fæces? Has Nature been right or wrong in making their receptacle such an one as she has done for them? If she is right, then I say, the whole practice of physicking and purging to the extent that it has been carried, and even carried on now;—is a delusion. When we have continually done the reverse of good by opposing natural laws; and made disease where we should have stopped its first inroads, and by playing (all unconsciously, I will admit) into the adversaries' hands; we have, as a matter of course, left death to reap the harvest. To ignorance of many of the great principles of life, are all these things to be laid. Many who have been only wise in their generation, and many even living now, have expressed their disbelief in the *ars Medicinæ*, because, disappointed at every turn in their apparently wisest axioms and modes and means of cure, have said: 'Better had it been for the world if neither physician, surgeon, leech, nor even midwife had ever existed.' Thus, because they quarrelled with their own ignorance, they seemed to infer that nobody could ever know more than they did; and so condemned the

God-like calling itself. This is always the case. But at the risk of shocking society with new ideas, I am bound, in honour to myself and duty to my fraternity, to express my views on these important points, and show, that it is to the colon and its filthy and disgusting contents, we owe much of the health and happiness of our lives.

October 18, 1865.

LETTER XXIV.

SIR,—Our inquiry must now be directed to the colon itself. As there are so many good descriptions of its anatomy in appropriate works, it needs only reminding the reader of its peculiarities as compared with all other viscera. Thus the cæcum is the first portion of it to receive all solid matter from the small intestines, and shut it off immediately from its former tracts by the ileo-cæcal valves; and so the faeces become exactly what they are—namely, excrementitious matter. There is no longer anything therein to be digested, nor do they contain any nutritious elements; but are completely excluded from all further acts of this kind in the body; just as we may imagine the contents of a sink or cesspool outside a house. In fact, both are got rid of in much the same way, and cast into separate departments, as no longer necessary; but rather an offensive matter if allowed to remain where they were first generated. In investigating the character of the colon; we find that its muscular fibres are longitudinal, and all tied together by a common

band running through its entire length. So that what we ought to expect, we find reversed, for this reason; that if they had been circular bands and fibres, these would contract upon the contents of this viscus, and so assist in propelling them; whereas the reverse is clearly evident to all anatomists and physiologists. Hence, as I have said in a previous letter, in explanation of the peristaltic action of the bowels; there cannot be any action of this kind in the colon, and I deny emphatically that there is. Its very anatomy bears me out in this opinion, for that which would have assisted progress—namely, circular fibres to its muscles and peristaltic action, are both absent; the one as a fact—the other as a law. We can come, then, to no other conclusion but that detention is the object Nature had in view; which is further proved by the fact, that rather than allow these abominable and disgusting faeces to pass away too quickly; she would sooner permit them and their gases to distend the viscus, as she often does; and so it frequently becomes, at various parts, in a very sacculated condition. This commences even from the very first part—namely, the ascending portion.

Now, this is the hill that is to be traversed first by the faeces, on the principle of the *vis à tergo*. Arriving at a point about a third or middle of the liver, on which it presses, and resting in its ascent on the right kidney as well; it takes a turn and becomes what anatomists call the transverse arch of the colon. Here, again, is a curious arrangement by which this part of the common sink or cesspool of the body, is made to rest on the duodenum, and partially on the pancreas, as well as against the lower part of the stomach. It

is partly covered by peritoneum; but some of its posterior portions are not. Here the fæces, after having mounted perpendicularly, are pushed along horizontally. The same law apparently regulating this part of the viscus, that instead of hastening them along it, its calibre is often distended, which necessarily retards their progress. What an odd thing for Nature to do! But we must look facts in the face. At the end of this gallery there is a turning point or corner resting on the spleen; and thus we come to the descending portion, which has a very short length at this part resting on the left kidney; so that there is hardly an abdominal organ which this filthy sink does not touch, or rest upon, or is contiguous to.

Now, this descending portion being shorter than the ascending; very soon gets to the sigmoid flexure, which is nothing more nor less than a treble turnpike gate. This singular formation illustrates a curious fact, which is, that instead of the fæces resting on parts pointing downwards; they rest on three distinct horizontal lines, precisely as they do on the transverse arch. We may presume, that they have no difficulty in passing round the four corners, which are made by this arrangement of a letter **S** turned on its side. But getting over the last, the fæces pass into the rectum. Now, this, again, instead of being a straight gut, is a curved one; which may be divided into three parts, and we shall find the same law occurring here: that as fæces get into the upper third, they rest, not upon the point pressing vertically upon the second third, but on a bend. Again, when they reach the centre third they do the same; and when they get into the third division, the same fact obtains there also. If this was not the

case, they would drop at once perpendicularly upon the sphincter ani. But the natural anatomical provision has rightly guarded against this; and for this reason, that a longer or shorter detention at each of the three curves is necessary. Hence, from this arrangement, the fæces in their ordinary state are under the will of every individual. It does not follow, that when fæces get into the upper and centre third of the rectum, that there ensues a hint from the electro-nervous batteries in that part, of the desire to get rid of them; because they may remain some time in the two upper thirds, and no notice given to the owner, that it is necessary for him to prepare for the act of defæcation. It is only when they get into the third and last part, that this notice is duly given. So that we see from the first moment to the last, throughout the whole of this tube, that every opposition is offered to the passage of the fæces through it, even in a natural way, when the individual is in perfect health. But when he has a departure from this state, we find that Nature assists this act by distending given parts along the line and making sacculated portions for its use.

Now many would consider that this was a diseased condition. Let them think awhile; and they will learn, that it is a process designed by Nature for curative purposes—for purposes of life and health. All these anatomical arrangements are worth considering more deeply than they have ever yet been done. Anatomists have shown how all these parts are supplied with their due and proper arteries in order to keep up their structure; not their secretions or any other matter physiologists have set forth; for I have in former letters

denied that the blood supplies anything but elements of structure; and that it has no power to supply secretions to organs as well; nor the lubricating fluid elements which the body uses daily to so great an extent. Let us give the colon from end to end, all the arterial currents which anatomists have seen to go to them. Let us take the veins, as books have recorded them, as well as the nerves which supply them from their several varied sources. All these facts have only to do with the upholding and general nourishment of this viscus; but nothing whatever with the acts of the colon itself, or the usefulness of its contents.

We have seen that little or no oxygen gets into the colon along with the fæces; and therefore we must naturally suppose, that the emanations from the fæces resemble pretty much those of a common cesspool, and which in fact they do. Its gases are all of the most poisonous character; for they are rich in all the hydrogens, mixed with the sulphuric and phosphoric; and having nothing to prevent their formation, must have their full delight and revel in this human sink. It is the knowledge of this which has led the Faculty to be greedy of the expulsion from the system of such a mass of filth. Yet if we look at the perfectly healthy individual, who gets his regular morning action of the bowels, we might think that he empties the whole of his colon in that act; but he does no such thing. Nature is too wise to allow anything of the kind; he only gets rid of what there may be in the rectum, in the sigmoid flexure, and part of the descending colon. Abhorring a vacuum, she retains two-thirds—namely, that which is in the transverse and ascending colon and cæcum. So that, in fact, the colon is kept always

two-thirds full, and once in every twenty-four hours it is quite full. We necessarily infer, therefore, that the fæces are constantly generating these foul and poisonous gases; and by the wise law of exosmose, these, being principally hydrogens and very light in their character, must permeate the porous structure of the intestines, and find their way throughout the whole body.

Now, there is at this time much said of free air; good ventilation of rooms and buildings; a given quantity of cubie feet of free oxygen to every individual, four hundred at the lowest for his actual necessities: for when there is less and numbers are congregated in one apartment, this room becomes a fever or typhus den;—which it often does. The opinion is, that the fever or typhus is produced through want of due ventilation, or a proper quantity of pure oxygen. Now this I demur to. It puts me in mind of a friend of mine, who frequently has to complain to his wife of one of the breast buttons of his shirt always coming undone. He declares that the button is too small for the button-hole; and she as stoutly maintains, that the button-hole is too large for the button. This is just the case in point. Some declare that the want of oxygen causes the fever and typhus; while I maintain that it is the poisonous elements from every individual's own body. But, says the hygeist; if there had been proper quantities of oxygen, these poisonous elements would have been in some way neutralised. Just so; but then, the poisonous elements are always there, and that the fever and typhus are due to their being in excess, and not neutralised; they poison—and so the argument might go on. While on the other

hand; man gets certain classes of diseases, entirely through the absence of these poisonous elements; but he could not have health without them. Nature having fully provided for the fact of their being made, and afterwards using them in her own way; we have to find out why an incessant exosmose of these poisonous gases permeates the whole body; and more particularly the tissues and interstitial spaces. By all these inquiries we shall find a clue to the regular actions of the bowels in some persons; the conservatism of constipation in others; and the laws which obtain, that many diseases, if left to themselves, that is, to Nature alone; are cured by these wise acts. So that we have to prove their relative value in the system, and why they are so useful in health, and that we could not have health or even life without them. And we have further to demonstrate, that they are the means of producing many fluid elements in the body, which the body could not do without; and which neither the blood can supply nor any other form of secretion from any other source. And not only this; but that some very important solid matters and structures of the body are also due to their presence; as well as many natural diluents of which I have spoken in previous letters, which the blood never supplied and never could supply; and, what is more, would never in any quantity become a part of the great circulating medium itself.

October 25, 1865.

LETTER XXV.

SIR,—My last letter contained many important, and no doubt to the general reader, many strange ideas; as well they might be! because they sap the foundation of much of the physiology of the age, that is, the age's belief in a number of things which it calls physiology, but which has no right or title to the name; for true physiology will some day be ashamed of their very association. Present belief in many things, upheld by the powers that be, through want of knowledge of natural laws; will sink into nothingness when replaced by more logical and, consequently, more truthful discoveries. However, let that be. Whatever is new must be tested and pass through the usual ordeal of new matter.

Before pursuing the subject with which I terminated my last letter; I must refer to a remark made in a former one, that physiology is based on inquiry and the asking of many questions, not of men, but of Nature. The first which would strike everybody, is, what becomes of the vast amount of oxygen we consume in every possible way, every moment of our lives? For let it be remembered, we are not exhalers of oxygen but consumers. We could not breathe without oxygen, and in chemical and other works, records have been given of what the lungs can do in this way. Well, and if they do all that is said of them, oxygen seems only a natural element to excite respiration; for we see that immediate conversion takes place after inspiration, and we expire a different gas. All this is as old as the hills, and great is the quantity taken,

but it is not a tithe of what is consumed by other parts of the body. We are always swallowing; deglutition of some moisture is always taking place; and if no perfect or actual deglutition occurs, still, there is a constant trickling down the gullet of moisture of some sort. Every mouthful we take we carry down oxygen with it. But let us drink off a tumbler full of water or anything else, it is done in a second sometimes; what a vast amount of oxygen goes down our open throats then! There are times when the body is in a passive condition and consequently in a state of endosmose, so that we absorb it largely. In our ablutions or baths we do the same. I do not believe that any man can calculate the amount absorbed and taken up into the system; though some ingenious men have tried to calculate the radiation or exosmose of matter from their bodies. Well, we naturally ask, what becomes of that which we take, absorb, and consume? It cannot remain pure in the system as it is received; therefore, it must be immediately converted to some special purpose and neutralised by some other gas, with which it has a great affinity, and in this union, form some other element. Whichever way it is disposed of, we naturally ask: Well, what becomes of it? Now, as Nature herself will answer the question best, I shall leave her to do so.

‘It is a vital agent truly, but animal life requires more than this. I found it was impossible to make it without using fluids largely; I made a framework of solid structure—namely, the bones, and surrounded them with muscles or flesh by condensing the fluids; and for the flexibility of these, I made them of the greatest variety of forms and sizes; so that all animals might

be capable of using their varied powers according to given laws; but the amount of fluid constantly required for their lubrication was so immense, that I had to keep them continually supplied with it. I made the arteries to carry a regenerative power to structure alone; and when they had done this, I required their more fluid residuary elements as diluting agents to those which were formed from the fresh ingesta. I apportioned certain organs to make their own secretions, from other sources than the arterial currents; for if these had to make secretions and lubricating fluids, as well as organic structure; I should have had no venous blood at all; it would, in fact, have all been consumed in these acts. Therefore, I kept up a balance in these two distinct currents; one going from the heart and the other to it. But, as animals required as much or even more fluid in their systems for their daily use, than is contained in either my arteries or my veins, I provided for this in a manner physiology has not yet pointed out. Living, as I have made all animals and, in fact, all life and everything that has a vital and living principle, in an atmosphere; and this atmosphere known to mortals as gaseous; can it be supposed for a moment that I have done this in the contracted and limited manner men have set forth? No, I have a thousand other sources for the formation of fluids, as well as uses for them. Mortals have discovered to some extent the ratio in which gases combine with one another; and that in my laws nothing remains the same from one moment to another; but whatever I have made is constantly undergoing some law of metamorphosis. This then is especially applicable to the gases; and therein you will see my great

wonders, for the gases of the body seem to have eluded men's thoughts. It was for this purpose I made the colon to receive the fæces; and from these fæces there should be eliminated sufficient hydrogen and other gases, for the purpose of combining with the oxygen absorbed into the body; and thus supplying it with fluids of such pure and excellent quality and quantity, as to form the natural moisture to all the tissues and parts. The design of the colon may now be seen; that it should be always more or less filled with fæces for this purpose. The amount of hydrogen is therefore regulated by each individual's idiosyncrasy, to mix with the quantity of oxygen his system can absorb or use. Some idiosyncrasies absorb oxygen so readily, while at the same time their fæces radiate the hydrogen so quickly, that they get by the union of these gases enough fluid elements for the functions and uses of the body generally. In these the regularity is so perfect that, if the fæces eliminated more hydrogen than was necessary, there would be a want of balance in the system; therefore directly these are accomplished, I dictate the removal of the superfluous fæces from the colon; otherwise excess of hydrogen would be the result, and the health of such a person would necessarily suffer from their retention. So you see I care not how fæces are made, or what they are made from, as long as they are made, and are duly deposited in their proper receptacle. What does it matter to me what food an animal takes; each after its kind, whether carnivorous, graminivorous, or omnivorous? Their organisms are perfect for each, and what they like and what agrees with them, I, Nature, assert they ought to take; for I have sent everything which is good

and nourishing to every one of my creatures. If more aliment is taken by any individual, and consequently more fæces made than he requires when in health; his natural state gets rid of them oftener, as things which he does not want or has in excess. The hydrogens being so elastic, so volatile, so penetrating, and the porous structures of the body so permeable, that the moment they find their way through them they meet with oxygen everywhere; and thus I am enabled to make very many pints of fluids throughout every structure in the body every day; and by this means, I lubricate every part with a moisture and a fluid entirely independent of the blood, which is used and exhausted incessantly in a thousand ways. By this means it is, I make the body so plump and round; so full, and the form so generally and so well maintained. The artist and the sculptor are more indebted to my gases and independent fluids, than they are to all the arteries and veins, or the plentiful and beautiful currents they convey. Do they delight in painting and sculpturing poor, lean, haggard bodies, frames or faces? No! they prefer those forms which the full benefit of my gases alone can exhibit to them. Look at the beautiful, plump, well-rounded figure, with all its graceful proportions; every muscle of the body and feature of the face redundant with my principles of health, produced by regularity in the union of the gases. In a few hours; when a cholera or a severe diarrhœa has removed from the body those fæces which generate the gases I designed to resist the oxygen of the air; behold then the sunken eyes and cheeks, the flabby muscles, the prostrate frame, presenting an object of pity and disgust, rather than

admiration. Has bone or flesh or blood ought to do with this? No! all are there, but the oxygen meeting with little or no elements with which to amalgamate, rapidly wears out the very structure, it but a short time before, was the cause of plumping up and rendering so beautiful. All the elements from which my hydrogens were eliminated, have been removed, and therefore no more can be formed; the skin lies loose, the muscles and tissues having partially lost their moisture; sunken, prostrate and collapsed now lies the frame. Anon, restore the fæces and let the gases once more unite in all their integrity; and they will again produce their many pints of moisture, and fill out the frame once more to all its pristine loveliness. Take, now, a healthy person and suppose his fæces failed to eliminate a proportionate quantity of hydrogen to the oxygen he absorbs; they are then retained for a longer time, for the specific purpose of doing so. On the other hand, another may have a regular action of the bowels every day or even twice a day, and this be accompanied by the best of health. It would be wrong to suppose that the condition of health is in consequence of such regularity; because another individual would not be in health, if the same thing occurred with him. Such persons having only the best of health, when their bowels are more conserved. Therefore, because a large number, having regular daily actions of their bowels are so well; it is no reason why others, equally well with the deferred act, should be brought to their condition. It is just as absurd and hurtful, to bring the former class of persons to the condition of the conservative class, as the conservative class to theirs. This is one of the greatest errors in medication which

poor mortals have always committed. It has been their bane for thousands of years; because they have never considered the gases of the body in their proper light. ' Could it be supposed for one moment, that I would have made such a provision as the colon for the fæces, and the fæces to generate gases, if I had not made the atmosphere? My arrangements would have been entirely different. If oxygen, and consequently my atmosphere generally, was not what it is, in respect to the individual formed to live in it; what would be his state? Why he would be filled with his own hydrogen so quickly, that he would bound up into the air and be like a balloon, or every one would be knocking about against his neighbour. But all this I have regulated, if man would only take into consideration my laws. Many blame me, because their choicest and most cherished dogmas fail them; this is not my fault, but rather let them blame themselves, if they act counter to all my proceedings. Their doing so, is because they have not studied and observed my acts in the laws of disease; or the beautiful yet simple processes, which sustain life and health. They prefer rather to take the authority of men and books, than observe me and my wonders for themselves. I notice a general fear amongst all, of differing in opinion from the dogmas of schools and schoolmen; for those who do, seem marked out for scorn. But he is both bold and wise who permits no such fear to influence him. Watch me closely in disease, and you will find more wonders in the actions of the colon, my great laboratory, for the evolution of the vital gases, than you will find elsewhere; and you will discover many things of which

the schools, with all their boasted learning, have not yet dreamt of.'

Listening thus to Nature; and reflecting on the failures a great empiricism has entailed upon our best endeavours to treat the sufferings of our fellow-mortals; I will endeavour to illustrate some of her marvellous acts, bearing upon the points above alluded to.

November 1, 1865.

LETTER XXVI.

SIR,—Proceeding from my last letter, let us consider the physiology of 'The Lion and the Cow.' The former is an animal full of muscular strength, on which his very existence depends. He is ever watchful and vigilant, for his powers may be called upon at any moment for attack or defence. He is exposed to the air night and day, in his natural state, and is incessantly on the alert, like all animals of the same class, who have to provide for themselves. He is no doubt often greatly pressed for food, yet does not seek it till he feels the pangs of hunger, and then he has often to wait some time before he can get it. Now we naturally ask how he gets his powers of endurance and his strength; for often from the climate, which is his habitat, the lack of water forms one great feature. What could prevent these animals from fevers and sometimes total annihilation, considering the immense amount of oxygen which they must consume? When in the extremest hunger, they have seized their prey; they suck its blood and devour the more juicy parts;

then, having gorged to their full extent, they slink away to their lairs in the deepest recesses ; simply because they should not be disturbed. A child with a club might approach and kill them at such a moment ; but empty and hungry, and full of muscular and fierce strength, a giant (without a rifle) is no match for them. Here, then, we see a carnivorous animal, living in a tropical climate, often pressed for food and water, yet strong, and all his muscles well lubricated with fluid. Besides which, he is able to make an immense amount of the salivary juices, of bile and other secretions, to be used again in the system ; and which are absolutely necessary for the digestion of his immense meals, which we see he gets only when he actually wants them, and these at irregular intervals. We are then told, that he does not have an evacuation of his bowels oftener than once a month ; when he deposits the smallest portions of mere earthy matter, scarcely worthy even to be called *fæces*. Can the arterial blood supply him with more than structure ? Can the venous blood supply him with more than diluents for the chyle for his new ingesta, and for the necessary and immense proportion of bile such a creature requires ? Where are all the other lubricating fluids to come from, as well as the vital secretions necessary for such a brute, living in such a manner ? Here, then, we see Nature's bountiful provision in supplying hydrogen to the very utmost extent from his *fæces* ; because otherwise we cannot account for the immense quantity of *fæces* he must make from such meals as his, compared with the small amount he actually gets rid of. Now, one of two things must occur, if the hydrogen was not generated, and when generated have oxygen to combine with in

sufficient quantities ; how could this animal be furnished with the very many pints of fluid his system requires in every twenty-four hours? The hydrogen would either poison him, or the oxygen would wear out all his tissues; and from his natural calorie and carbon he would be subject to fever, and so be burnt up. The union of both save him. Can any other physiological law explain, why his colon is so conservative an organ ; or how all these vital powers are maintained in their integrity, except in the way I have now propounded ?

Let me put the case of a gentleman in juxtaposition with the lion ; one who lived for more than twenty years in the driest and most arid part of Mexico. In that time he saw Europeans out of number consigned to their parent earth. Fevers, dysenteries, diarrhœas in all their forms, carried them off ; while he never had an illness. He was one of those men, who was satisfied to be in health, under his peculiar idiosyncrasy of insuperable constipation. He never suffered from thirst as others did ; he never had a fever the whole time he was there. His constitution is even now entirely unaffected from his long residence in such a place ; and he had sense enough to guard himself from the pest of Medical empiricism,—cathartics. But every two or three weeks he had his little scybalous action of the bowels. He thus preserved the moisture in his system, provided by Nature by the union of the hydrogens he generated himself and the oxygen of the air, in which he lived ; independent of what he drank. While he saw that the Europeans, who insisted on having their bowels relieved, sink around him ; and those who had any tendency to looseness, unless they could get away in time, would soon die ; and there was not the slightest

hope for anyone who had dysentery. Yet these things are happening everywhere, and physiologists take no notice of them.

Now, let us take the cow. What is she? A large mass of indolent aggregation of fluids; she lives only to make them. Her powers are totally opposite to those of the lion. She has not to provide food by her own exertions; she is a helpless, stupid animal, only fitted for what she is, to graze from morning till night in the fattest pasturages; to be loose in all her muscular fibre; to carry a large proportion of fat and bulk; to have intestines highly distended; to drink largely; to increase her species at every available period, and from the constant action of large milk glands, to yield their fluid to the greatest extent. This milk is no secretion from her blood. Is there a physiologist adventurous enough to say, that the milk is a product of the blood? It is enough that her arterial currents supply structure; for her venous currents are far greater in proportion to them. From what she consumes, we necessarily infer, that her own secretions are immense. Her colon is large, and though she may have a semi-fluid motion every hour; still it is always full. We must therefore infer that hydrogen in its purest form, unmingled with much sulphur or phosphorus, is the gas alone which is eliminated from her excrements. Living as she does, or ought to do for health, almost always in the atmosphere; the oxygen she consumes is necessarily large. The union of these gases supply her flabby tissues with many pints of fluid in every twenty-four hours. Kept in this moistened state, she is what we see her; and could only be this quiet docile animal, yielding quarts of milk daily. If

cows are kept as they are in London in sheds ; and never from the time they go into them, to the time they are past the uses which man can make of them ; to be fed and milked, fed and milked, night and morning for years ; our only wonder is they remain in health at all. Nothing but their inert natures ; the undisturbed serenity of their peculiar characters ; with just sufficient oxygen to combine with the hydrogen they themselves make ; with only the commonest care, though often unwisely kept in half-cleaned stalls. Yet still they live and furnish, though not so largely, their fair proportion of milk. The healthy balance of their secretions is due only to those unerring laws of Nature, the union of their gases ; but being free to a great extent from those which the carnivora and omnivora generate in the colon ; they are less susceptible to disease from morbid conditions of their secretions generally. The thin, lean cow, soon fails in all her duties and usefulness to man. Her poor appearance being due to the two causes, of not making hydrogen sufficient for the oxygen she consumes ; and therefore with less power to resist the atmosphere in which she lives. Can any one, viewing these two animals in their separate and distinct natures and modes of living, come to any other conclusion, but that conservatism of the fæces in the one, and a constant semi-fluid condition of them in the other, are the result of natural laws ; and that to reduce either to the condition of the other, would do violence to both ? We see the one, the king of the forest, wiry and above all, carrying little flesh or fat. His whole frame, well and firmly knit together, muscles more like a mass of tendonous fibres ; lithe and lissom and ponderously elastic ; with a brain power endowed with

instincts on which his life depends ;—the other, all the reverse, with scarcely an instinct for her own preservation. The life and powers of the one dependent more on the conservatism and value of his fæces than on his food ; that of the other, in respect to her usefulness to man, on her succulent food ; but on the constant discharge of her fæces, because excess of other gases than hydrogen should never occur, and so reduce her value and the general purity of her body.

From all these facts, we can deduce a law of idiosyncrasy in those individuals who have their regular daily motions, and those who have conservative habits. The various epochs which this conservatism takes, vary from every other day to two months. Since I first investigated this subject some twenty years ago, I have known many hundreds of individuals, and very many entire families, who had no regular actions of their bowels ; but with habits varying from a week to a fortnight or three weeks. Where observation has once been put on the track, information of these apparently remarkable conditions of the system, accompanied by the highest state of health, have been brought to me. An intelligent chemist in the country told me a countryman came to him for something to act on his wife's bowels, for she had been put to bed with a child six weeks ago and had had no motion since. He was so alarmed that he told the man he had better go to his doctor. ' That's no use, he knows all about it,' said the man, ' his wife always went six weeks.' Again, a friend of mine had the following fact from the best authority : An old gentleman in the country who was ninety-seven years of age, had never, since he was sixty, more than six motions a year : one every two

months; and would always joke with the doctors, and say they would have killed him years ago, if they had had their way. I have heard of a colonel in the army, who did not have a motion sometimes for six months; and then nothing to signify. Probably like the lion, some dry earthy matter. Let, then, physiologists be once put upon the right scent in all these matters, and they will come to the conclusion I have arrived at for many years—namely, that the value of the fæces as fæces in the body has been overlooked. That the very anatomy of the colon, as I have shown in previous letters, clearly indicates, that Nature has designed it to be conservative at important periods of everyone's existence. That if we take all the most valuable secretions of the body, which are made by it to be used again, such as the saliva, gastric juice, the mneo-membranous secretions, the bile and a thousand others—take, I say, all these from every source and combine them; they are not then half so valuable as the fæces. These supply all the organisms with those gases, which Nature requires to resist the atmospheric elements and pressure, in which they are destined to live. It is not only the resisting powers which are offered by these, but the fluid elements which are generated from their combination with their opposites, and that all our brain power, as men, are due to them. So that, though the fæces are not used as other elements of the body, they yield from their whole mass throughout the whole length of tube, they have to pass through, and from the constant opposition offered to their passage, vast amounts of gases of the most important and necessary character, and vital to the whole bodily and mental structure. As all these are matters of health, regu-

lated according to the idiosyncrasy of every individual, I shall conclude this, and in my next will show the beneficial action of conservatism of the *faeces* in disease.

November 8, 1865.

LETTER XXVII.

SIR,—The first point I have to notice, where aperients are hurtful in the highest degree, is when they are given after parturition. I claim some authority here, as having had above four thousand infants to my hands from their birth, independently of miscarriages. There is not a more important subject in physiology than what I am now about to touch upon, and I am pleased to see a feeling growing up in the practice of Medicine, on the subject of the treatment of our women in these cases. I have always considered the practice of low diet, almost equal to starving; combined with purging of the parturient female, as one of the grossest of errors; and that these cases have been treated more as eases of disease, than what they really are—namely, simple natural acts. Therefore, to keep a case of this kind for days after parturition on gruel; and on or about the third day after, to purge; is nothing short of premeditated manslaughter. In the largest percentage of these cases, we have a right to conclude, that there is a good condition of health, with a natural act to be performed. It is called ‘labour,’ and God knows it often is, and very hard labour too. Suppose a female pressed by some dire necessity to walk twenty miles within a given time; and as a consequence to become perfectly ex-

hausted. She is put into bed and a doctor sent for, who hears her story. Would he, knowing her exhaustion from such a source, keep her on gruel for a week or ten days, and order her purgatives? No! He would say, Let her rest and give her nourishing things. But what has been and is now the general treatment of these natural parturient eases? These natural labours? These simple natural acts of great effort, with a call upon all the bodily and muscular exertion of a female in the highest health and condition? I am grieved to say, except with a few far-seeing and intelligent men; that it has been a gruel diet for some days or a week, and on the second or third day purging. What for? Is there disease? No! The patient could eat and drink if permitted, but they are forbidden, through the grossest ignorance of physiology, to do so. Now, let us look calmly at the fact. A healthy woman is suddenly seized with the pains of child-birth. The first pain almost invariably produces an action on the bowels. As labour progresses, a second may occur; and as the child is passing the outlet, should there be any fæces in the rectum, they are pressed out. Well, then, the colon may be said to be empty. Now, I have shown that it is distinctly necessary, that it never should be empty for any length of time. I have shown the value of fæces as fæces, from whence the body gets certain gases to resist the oxygen of the atmosphere around and about it. That these gases are necessary to form fluids, as well as to keep up the plumpness of the body; and not only this, but brain power from the phosphorus, which they also eliminate with the hydrogens. Now, how long does it take properly to fill the colon under the natural circumstances, of which I have been speaking? Why,

several days, under the best diet of meat once a day, and the satisfying supporting fluid of malt and hops; and when the colon is tolerably well filled, and the fæces sufficiently abundant to make their gases, an ejection of the excess as surely takes place, as that pigs squeak, or any other natural act. The consequence is, powers are restored in their proper way, and we have what is called a good ‘getting up.’ Milk is formed in sufficient, even superabundant quantities; and Nature, in all her beautiful laws, is triumphant. On the other hand, what do we see? The female starved upon gruel and bread and butter and tea. What a sorry fare to make fæces upon! Yet they are made to a certain extent, but of very poor quality, nevertheless. On, or about the third day, however, a dose of castor oil is administered. The doctor orders it, and the more ignorant nurse follows the advice promptly; to do what she, in her capacity, says, ‘to cleanse her.’ To cleanse her from what? She believes to cleanse the womb. God save the mark! But I verily think some doctors believe so too. So that, with only this insufficient diet, and while Nature is trying to abstract power from the poor mass formed, even that is to be carried off. What is the result? Utter prostration of power, and little secretion of milk. When this has lasted a week; some beef tea may be ordered, but the poor patient getting low, a little brandy may be given. Then it is wondered how a strong healthy woman, who before the normal act of parturition, which had been performed in a natural way, should be so low and prostrate. No wonder we see those melancholy facts under the head of Births and Deaths—viz.: ‘On the 1st inst., Mrs. ——— of a son.’ In a week or ten days after, ‘Died Mrs.

——.' What a pity this episode could not be completed by adding, 'from starving and physicking *secundum artem*, after a natural parturition!' It has been my lot to have been called in in consultation, in many cases of great danger after parturition; from the sole cause of the patient's having been kept too low; and I have pointed this out to the gentlemen in attendance, and warned them against this absurd plan of treatment.

They say they are afraid of inflammation, or of milk fever! Now, the lowering plan is the very best in the world to produce these evils. It is of no avail, that some members of the Profession occasionally bring forward the fact, of our parturient women being kept too low; they state these circumstances as the simple result of their own observations. If they were accompanied by a philosophy, such as I have set forth, they would make greater and more lasting impressions. Parturition is not disease, and therefore, there is no reason or common sense in these cases being treated beyond the first day by slops or gruel; a daily chop after the first day would be more support, and if not accompanied by a glass of porter, this may be added the third day with advantage. When faeces of sufficient quantity and quality have been made, Nature will always get rid of the superabundance by her own laws; and a few days' conservatism will do more good than harm. It is more in accordance with all natural and physiological laws. All these matters I have now advocated for more than a quarter of a century.

The next cases where conservatism of the colon is seen to be a natural sequitur, is after heavy falls, blows, or contusions. Nature immediately after these, requires all the powers she can collect from every source, and none more than from the gaseous elements eliminated

from the fæces. Again, from severe burnus, she shows her wisdom in this act. Last year I had a case of a brewer's apprentice, who fell into boiling liquor up to his middle. He was enabled to lift one leg up, which was consequently not so much scalded; the other, to above the knee, was in a frightful state; so that in pulling off his tronsers and stockings the whole mass of skin came away. In order to relieve pain, I dressed his legs for forty-eight hours with that beautiful and well-known preparation,—equal parts of linseed oil and lime water. After this, I put his legs into a mass of wheaten flour; excluding the air entirely, and dressing them once a day. The discharge from the most injured limb, as is usually the case, was enormous; forming with the flour great cakes, all of which were carefully removed by the spatula, and the leg again put into the flour, and flour applied thickly by the dredger to the upper portions. I gave him opiates, and *kept his bowels confined for a fortnight*. With this and good and generous diet, the limb recovered most rapidly. Nature dictated the removal of a large consistent motion in her own due time; and in four weeks the whole limb was perfectly restored, the new skin only showing a little redness. I attributed the rapidity of the cure, and fresh formation of the new parts, entirely to the conservatism of the colon, and the vital forces and powers gained therefrom.

In all operations, the very first thing that should be done by the physician and surgeon, is to conserve the bowels, and follow out what Nature is sure to be the first to do. This I have already spoken of, after the operation of extirpating abdominal tumours. All these matters relate to cases where accidents or other circumstances occur in a high state of health.

Now, the Faculty, as a body, do the very reverse. Their first question is—Are the bowels open? If not, they set about opening them directly, and keep them open against all philosophy.

On the other hand, let us consider how Nature deports herself in certain diseases. In fevers, for instance, the fact of constipation setting in coincident with them, seems so glaring, the only wonder is that those who have had the greatest experience in their treatment, and who must have seen this, have not looked upon it more as a law, rather than as a reason for opposition. It is now twenty-five years since I first noticed this fact, and, willing to watch all natural laws, I let a case go on; and, while I did not interfere, it did well. But the mother being alarmed at a conservatism of twelve days, injudiciously followed the advice of a sympathising friend and gave a dose of castor-oil. This produced an action on the bowels which was followed by delirium; and nothing that art could do, was able to prevent a persistent diarrhœa, and in consequence the patient died. I asked her if she had given any aperient, she said ‘No!’ I taxed her again with it: she still denied it. But when her child was dead, I again asked her to tell the truth, feeling assured it had been done; when she confessed to the fact. Nevertheless, this was an advance. In subsequent cases, I took better precautions, and my success in following this plan has been well rewarded; yet how unsatisfactory to science, to know a fact and not its cause! All these circumstances I have followed up step by step; until I am now prepared to state, that which I have in these letters relative to the value of fæces as fæces; and that we owe to the colon and to the fæces themselves the best vital

powers and principles of our bodies. Where a fever seizes us, which is to the body the same as a drought to the earth, all our streams and rivers, seas and lakes, ponds, canals, and rivulets become dried up. It seems of no avail to proffer the jug of pure water to drink, or to apply the sponge with its delicious moisture to the surface of the body ; all is soon absorbed and dried up. Where are we to look for the return of all these inward waters of life ? The body is scorched and it withers ; for Nature herself, failing to make her own fluids, annihilation appears imminent. All the moisture, through the whole extent of the primæ viæ and the colon, becomes absorbed. When this is done, robbery and felony succeed everywhere. The two great currents of blood in the arteries and veins must now yield all they can. No glands can act, for they are already impoverished. If the blood furnished them with their secretions, why does it not do so now ? Cannot physiology see even in this, that it can only furnish bases of structure ? To add to all this evil, the Faculty must step in and unwisely administer aperients ; but they get nothing by them but evils. Where is the moisture to enable fæces to pass ? They get little or none ; probably only a little coloured matter which they have forced out *vi et armis*. But if the bowels are allowed to remain constipated, hydrogen from the fæces may yet be generated, and combining with the oxygen, that natural moisture which the body requires, is gradually restored, and with it all normal streams and rivers. No wonder the Profession take credit for a negative, and say they treat fevers better now-a-days, because they leave them alone to Nature. She conserves the colon, and the fever then abates. As soon as it begins to do so, a firm, healthy, solid stool is

the result; surprising everybody. A stool such as the healthiest individual delights to pass. Therefore it is in fevers we see the true value of conservatism; and it was from fevers I learnt my first lesson in the true physiological uses of the colon.

Again, as regards headaches; it is supposed that these are produced most frequently from constipated bowels. Well, so they are occasionally; but it is from this fact that so many errors have arisen, because no physiologist has ever pointed out, that they are also produced from relaxed bowels, and, what is more, more agonizing and painful ones. People may be heard to say, 'If my bowels are not open, I have a headache,' but no one ever attributes a constant headache, amounting almost to a specific disease, to their bowels being too much relaxed. There is no greater mistake made than by writers on cerebral subjects, who have advocated the steady use of aperients in persistent headaches. Did it never occur to these men, that a headache might arise from a deficiency of structural brain elements or alimentary brain power, as from excess of either? I tell them that headaches arise oftener from the former than the latter, and that these are of that class, which are the most difficult to be endured. Yet I never knew an instance of both, that the same plan and treatment by aperients, were not prescribed. I have spoken in a former letter of the sympathies of the colon with the cerebrum or reflecting portions of the brain, and of the stomach and chylopoietic viscera with the cerebellum or the instinctive or animal portion. In papers such as these, I have no time to enter into the minutiae and treatment of these subjects. These letters are only designed to rouse thought on the subjects touched

upon. Neither can I now enter upon the diseases and morbid conditions of the colon, to show the wonderful errors which the Faculty have made, in their utter neglect of the physiology of this viscus ; and so overlooking and mistaking diseases therein, but attributing them to some disorders in more contiguous organs, which were all the while perfectly healthy. Having opened up this subject, I must leave it in order to consider some of the remaining organs of the body, such as the glands, the liver, the kidneys, fat, &c., &c., which are very important, and which I will commence with in my next letter.

November 15, 1865.

LETTER XXVIII.

SIR,—Has physiology clearly defined the true meaning, power, modes of secretion and uses of a gland? This subject has always appeared to me to be very much confused, for instance, the liver is called a gland ; but if a salivary gland is compared with it, what a wonderful difference there is between them ! The one, the liver, has no fatty surroundings, while the other is embedded in it. I think we should be equally justified in calling the lungs, a pair of air and blood glands, as we are, in calling the liver a simple blood gland. We see that the lungs are as free from fatty envelopments as the liver. What can all the fatty matter have to do with the salivary glands ; and why should they be so embedded within this structure ; while the liver and the lungs are kept entirely free from it ? Let us look also

at the kidneys. They are always embedded in a large quantity of fatty structure. Are we right in calling them glands? They differ amazingly in their action and duties to the salivary glands; as much as both these classes do from the liver. If all of them are to come under the designation of glands, they must be divided in some such way as this: The liver is a blood gland without fat and a simple receiver of venous blood; from which, by the assistance of its own structure, it extracts a fluid called bile, to be used again in the body, but getting no benefit from any fluid or element which fat or any other organism can supply. The salivary glands are organs embedded in fat, and secrete a fluid, varying much at different times in its chemical character. But then the question arises, what is the use of the fat round and about them? Has the fat anything to do with their functions or their secretions? for it is very evident, that it would not be there except for some wise and useful purpose; and as it always is there, we ought to conclude that there must be some reason for it. The saliva or natural secretion of these glands, is an element formed in large quantities, to be used again in the economy of the body. The next organs which are called glands are the kidneys, which are also embedded in fat. Now these secrete from the blood the element called urea, and probably some other elements along with it, for the immediate purpose of excretion; so that they should not get back into the system. But along with this urea and other matters, there is a large percentage of fluid. Physiologists have been accustomed to teach, that this also is eliminated from the blood. But here arises a serious question, seeing so much fat about them: has it anything to do

with the secretions of the kidneys? Now here we have three very distinct facts, which I am inclined to think, have hitherto been very loosely thought of and as unphilosophically explained. A gland without fat and a mere converting organ; glands with fat and highly secreting organs; and two other so-called glands which are simply excreting organs. The first and solitary one deriving no benefit from fat, as it is not there; and the two others having immense fatty surroundings with what must strike every one, some use to be derived from them; yet these latter are of totally opposite uses and characters. We naturally ask, can they be continued to be classed in the body as they have been? The next question naturally arising out of these considerations is; what can be the use of the fat in the two last so-called sets of glands, the salivary and the kidney; and why has the liver none? Perhaps there is no organ in the body that has, *per se*, been so much written about as the liver; or has had so much consideration given to it, or the universality of disease of every kind, sort and character, functional as well as organic, attributed to it, as well from its secretions as its non-secretions. These facts are not alone confined to the British Islands or wherever the English, Irish, or Scotch settle; but even in foreign countries; so that the French and German schools do the same as we do, and attribute the largest percentage of disorders and diseases to which the body is liable, to the poor liver or its secretions; whilst every imaginable drug administered, seems designed for, or is supposed to have some action thereon, whether it operates on other organs or not.

Now here is a viscus, one of the largest in the body, which, as I cannot designate as a gland, I will simply

call it a blood-converting organ. Its anatomy is of the simplest character, as well as its duties. It is fleshy and porous, not quite so much so as the lungs. The arterial vessels going to it only support its structure; but all the venous blood of the abdominal organs is emptied into it; which, with what it makes itself, it uses in its soft structure to make or rather to convert into bile. The residuary mass from this goes into the vena cava, and so helps as a diluent to the new ingesta, along with that of the venous currents from the upper and lower extremities. I have said in a former letter, and it well bears repetition, that if venous blood, well charged with biliary elements, goes to the liver, that organ is safe to extract them; but if these elements are deficient, how can it take anything from nothing? Are we then to attribute a clayey stool to a sluggish liver? This dogma seems to have seized everybody's mind, without thought, sense, or reason. Why not go deeper into the matter, and attribute it to want of the elements from which bile is made? I can give myself a clayey motion at any time, by taking an opium pill for any flatulent or colicky pain; but I do not for a moment accuse my liver of dereliction of duty. As long as my pains continue, from whatever morbid cause, so long will I endeavour to stop them. I will not suffer a moment's pain if it is in my power to subdue it; it would be less than human if I did. Some action which opium always produces, has arrested or caused in some way, the properties of bile in my abdominal venous blood to become diminished. But very soon afterwards, Nature having had time to get into a right tract again, I find biliary stools; but I never blame my liver. Again, if the liver has excess of ele-

ments sent to it, it naturally makes excess of bile. Are we to accuse the liver again of *mala praxis*? If any excess of bile is there at any time, it is from excess of material; and if there is a deficiency, there was nothing to make it from. If people, with a richness of biliary secretion, diet or starve themselves, as they often do, they bring on certain discomforts, and lay them all to the poor liver; when a good solid meal would be the best cure for them. Why not give the bile its proper employment? For if this is not done, it runs off in a diarrhœa; and if there is not sufficient bile, there is, in my opinion, some error in the first cause and not the second. I believe the liver to be a simple and an industrious organ in itself in all its duties and actions; and, reflecting on the ill-usage it has received from everybody, I often think that I am the only friend it ever had. Now I have abundant reasons for all I say on this subject, and these have arisen and been confirmed in me from my investigations of the colon. I have often thought that the Faculty, taking them *en masse*, have considered the body but as one huge liver; and have believed that all diseases arise from it alone, and that such a viscus as the colon never existed in it. As the Ghost in Hamlet says, 'I could a tale unfold,' and I am quite prepared to do it, from the thousand mistakes which are made every year in diagnosis, and all the blame laid to the poor liver, which it never deserved. It has been one of those misfortunes to the system, that the colon is what it is, and that it traverses the space it does, and has its various juxtapositions to other organs. Thus, for instance, if my readers have studied the colon in its anatomical and physiological uses, as I have laid down, they will have perceived, that the

angle of the ascending and transverse portion lies exactly upon a part of the liver. Therefore, without thought of the colon at all ; the great fault of the physician seems to have been to consider pains, enlargements, and great sympathies in this region as affections of the liver. I have said that Nature has designed the fæces for vital purposes, hitherto not admitted in the philosophy of Medicine, and that she causes or induces a sacculated condition of the colon to retain them. Now, she does this very frequently in the part opposite to, or in juxtaposition to the liver, as often as anywhere ; and these cases, if they were not so serious, that is, really not serious of themselves, but made so by the Faculty, they would afford much food for sarcasm. It so happens, that I have had many cases of this kind before me ; and as it is not orthodox to mention names, there are scores of our physicians and surgeons now living, who have committed themselves to opinions, which, if they had studied the colon more, they never would have done ; and the mere explanation of these facts may be a great guard to them in future. I will mention one or two cases in point which must suffice for the purpose.

A lady, aged forty-two years, mother of twelve children ; had a lump come on her right side, just about the place where the angle of the colon lies upon the liver. The best general practitioner and physician of a large provincial town attended her. They both pronounced it tumour on the liver ; she was mercurialised as a matter of course ; she was duly leeches, blistered, poulticed, and iodined. Months passed away, and she was no better. A change of circumstances in her husband's affairs brought her to London.

Here some of the first men at the West End were consulted, all declared the same thing; there was not the slightest difference of opinion. Tired and worn out by physic and external applications, and somewhat broken down in health, she went down to a hydropathic establishment in the country. The principal there concurred in opinion with the diagnosis already given. But the treatment here was simply devoted to restoration of health; as much exercise as could be taken, and as much good diet also. Not being considered entirely hydrophobic, she found she could not do without her sherry; and so she had it. One morning she had a large stool, then another, and in the evening another; and about the second day after this, she was placing her hand on her sore side, as she called it, and found, to her great surprise, the tumour gone! As she was getting stronger she left; and afterwards from her sixth completed her number of twelve children; but always found a tenderness over this spot, and it was for this only she consulted me. Having the opportunity of explaining her case, she, for the first time, found out what had been an enigma to herself, her husband, her friends, and her doctors for many years; namely, that it was a simple collection of fæces from a sacculated condition of that part of the colon. Fæces had passed the spot, leaving the old mass there for very many months. In short, it was no tumour at all.

One more case similar to this. A gentleman had precisely the same sort of thing, and consulted several of our first surgeons and physicians, and he named them all to me. ‘Oh,’ said one surgeon in great practice, ‘I have seen many of these cases. It will not come to anything; sometimes I have known them disperse, but

it will not get larger. I will read you a few cases I have had. I keep them under the head of "simple tumours of the liver." So he consoles the patient with these, and gives him directions how to act. Another surgeon saw it, 'He did not think it was on the liver but behind it.' Another said, 'It was on the intestine itself.' Well, that was a very near guess! A physician saw it, and could not make it out at all; so he asked him to call again by appointment to meet a friend of his, another physician. These two spent a long time over him, and then came to the same conclusion as the surgeon; of whom they both had the highest opinion. Another physician knew all about it at once; and said that that was a subject to which he had paid great attention; and, in fact, he was going to lecture on it that very day, and asked the patient to accompany him, which he did, and heard an hour's discourse; but making neither head nor tail of it, packed up his carpet bag, and went off to Germany the next day. He consulted a German doctor, who very wisely told him it was a decided case of dislocated kidney; which had shifted to that position. This determined him not to medicate any more. He said after he had been in Germany about a month, taking all the exercise he could, and living on light diet and light wines, he woke one morning and found his so-called tumour gone. In another fortnight he returned home; went first to one of his physicians; 'You are wrong, doctor, this time; I'll trouble you to find my tumour.' 'What did you do?' 'Nothing, I only got up one morning, and found it was gone.' He went to one after the other, and then to his surgeon. None of them could make it out. I drew his attention to certain facts of the case.

and he has not the least doubt, any more than I have myself, but that it was a collection of fæces in a sacculated part of the colon at that spot, of which I have seen scores.

In mentioning these facts connected with the liver, I do it for two reasons ; first, because I believe the liver a much maligned viscus ; and, secondly, because there is less known of the colon, its diseases, and its physiology, than any other part of the body ; and, thirdly, to put very talented physicians and surgeons on their guard, against mistaking simple sacculated states of the colon with fæces,—for tumours ; especially in that part opposite the liver. And I would suggest to note-takers, who have many cases of this kind booked ; not to credit any of them, unless they have made actual post-mortem examinations and *found them*. Thus, while Nature herself is bountiful to man in often conserving the bowels ; she does this act wisely and at all times well,—when her colon has never been tampered with by medicine. But, on the other hand, when mercurials have been constantly administered, which have tended rather to the enlargement of the liver, than any good ever got from them by that organ ; they have, on the other hand, together with aperients, so relaxed the muscular fibres of the colon, that when Nature has endeavoured to conserve the fæces, some parts of the colon have become sacculated by them, and factitious lumps have been formed along its course ; and are then mistaken for tumours. Many of these facts would form very curious episodes of the *Ars Medicinæ*.

November 22, 1865.

LETTER XXIX.

SIR,—Have physiologists thoroughly understood the value and uses of adeps, or fat; or sufficiently explained why it is found at various parts of the body and not at others? It has been asserted, and believed as truth, that it is a secretion from the blood; as every other substance and fluid has been. Notwithstanding the minuteness of the blood-vessels spoken of, through which this deposit is to be furnished; they say that the adeps, or fat, is conveyed to the ‘circumference of the column of blood in these vessels, and transudes through their pores.’ Now, I do not believe anything of the kind; nor, for one moment think, that this peculiar and useful structure can either be a product of the blood; or that blood is capable of supplying it with any of its *bonâ fide* properties. It is found everywhere where it is required, and ‘varies in quantity and consistence in different parts of the body and in different persons.’ ‘It is found in considerable quantity between the interstices of the muscles, along the blood-vessels, near the articulations, and in the vicinity of certain organs, as the eyes, the kidneys, and the breasts.’ ‘In the eyes it is soft and fluid, and about the kidneys of the consistence of suet.’ ‘Between these two extremes there are many gradations, and not exactly the same in any two different parts of the body; the high temperature of which, maintains it in a semi-fluid state.’ ‘Where it is absolutely fluid, it contains no oily substance.’ ‘In these cases cellular tissue yields more readily to extension, and membranes are more capable of expansion.’ ‘No real adeps is ever found in the skull.’ ‘Its quantity is about one-twentieth of the

weight of the whole body, varying, of course, in age and sex.' 'When digestion and absorption are performed with great activity, fat accumulates in proportion.' 'It is imperfectly animalised; *is analogous to the oils extracted from plants*; contains very little azote, and much hydrogen and carbon, yielding on distillation water and carbonic acid; varying in its proportions without impairing the order of the functions; it repairs waste, as is seen in hibernating animals, and is greater in the graminivora than the carnivora; the fat of the former being consistent and firm, and that of the latter completely fluid.' 'A corpulent man on having his diet reduced; the bulk and weight of his body diminishes from the absorption of fat, *which supplies the deficient quantity of blood*.' 'Adeps may therefore be considered as a substance in reserve, by means of which, notwithstanding the small quantity of food, and its want of nutritious qualities, Nature finds wherewith to repair the daily waste.' Such, then, is what physiologists say of the fat, (and I have quoted from the best authors,) that it is a product of the blood, and so deposited from it, that it is as it were, a capital to be used again. It is a very pretty theory if it were true, and for want of a better, it serves all the purposes of our present knowledge; but it will not, I think, stand the test of the future.

Physiologists further say that 'sebaceous acid is obtained from it by distillation, formed by the combination of *the oxygen of the atmosphere with the hydrogen*, the carbon and the small quantity of azote which it contains, which nearly constitutes it a vegetable acid.' 'Fat has a great affinity for oxygen; it deprives metallic oxides of a part of their oxygen; in proportion

as it absorbs oxygen, its density increases.' 'The cellular system may be looked upon as a vast reservoir; the fat preserves the body in its natural temperature, being a bad conductor of heat, fat persons scarcely feeling the most severe cold. Arctic animals, besides being clothed in a thick fur, are provided with a considerable quantity of fat; so are the fish in frozen seas, and all kinds of whales.' 'By its unctuous qualities, fat promotes muscular contraction, the motion of different organs, and the free movement, on each side, of different surfaces; it stretches and supports the skin, fills vacuities, and gives to our limbs rounded outlines, &c.' 'It envelopes and covers over the extremities of nerves; so that if they are too much denuded of adipose and cellular tissue, are exposed to external actions, as injurious as the rays of the sun to a plant torn up from its native soil.' 'Both excess and deficiency of fat are more or less injurious to the system.' '*According to modern chemists, the use of the fat is to take from the system a part of its hydrogen.*' 'Whatever moderates the activity of the circulating system, tends to bring on adipose plethora, such as indolence, hæmorrhages, &c., while great energy of the body causes emaciations.' 'The medullary juice is a very liquid fat, yet the marrow in bones has different density.' '*The secretion of marrow is like that of fat, a mere arterial transudation; it is performed by the medullary membrane lining the inside of the central cavity of the long bones; which in health gives no mark of sensibility; in diseases of bones after venereal or mercurial actions, the membrane becoming highly vascular, exquisite sensibility then arises.*'

It will be seen from these extracts, that it is the un-

doubted opinion of physiologists, that fat is a secretion from the blood most ingeniously set forth by the gratuitous theory, that the column of blood in the minute vessels, throws all sebaceous matter to their surfaces, on purpose to aid the exudation in all parts where this element is required; and transuding it from the few and minute arteries in the medullary membrane, to make marrow. But it does not show why blood in other vessels, endowed with the self-same fatty properties, fails to deposit these where they are not wanted, or why this is not done. Now, all these doctrines put the student of ancient dogmas, very much in mind of what anatomists and physiologists once said of the uses of the blood; or as much as was known of it after several centuries of patient research, before the time of its complete discovery. But when the circle, or the last and ultimate link was completed, then it was found that they were only pretty theories, if not mere nonsense. Nevertheless, this violence done to received opinions could not be borne easily; it so shocked the general community, that no anathemas or abuse were gross enough to be dealt out against the bold innovator. Now, it is just the same with the fat and its uses. If we can only arrive at some ultimate step far more consistent with truth, we should let in a great flood of light on many subjects, which now form stumbling-blocks at every step we take, both in physiology and the practice of medicine. The subject merits serious consideration: and as I have extracted the pith of what is said and really believed in, I do not see how I can treat of the glands without first disposing of this subject. Can it then be possible for the blood to secrete such an immense quantity of fat shown to exist in the body; and

if it did, how could the minute arterial vessels supply it, considering they never permeate the fat at all? Now, fat could not co-exist without a covering membrane; this membrane is very different to fat; it is highly organised and what is called animalised, while the fat is an unorganised non-animalised mass. Take the fascia then which invests it, and compare it with what it invests; there is no analogy between them; a proof, I think, of what I have already advanced, that the arterial blood can only supply structural powers to the fascia. Fascia, or skin, is a structure; but fat is only an inspissated liquid. Fat being found where it is, shows that it must be formed in a far different way; because it liquifies so readily everywhere, and in the living body is always in a certain state of fluidity; implying that the fluid or more aqueous portion is always being used up in some way, and must be renewed as constantly. The quantity taken up in the mere lubrication of the muscles, like grease to machinery or axles of wheels, must be enormous; yet, where most fluid, it is said to contain no oily substance. What then does it contain? No doubt as pure and aqueous a matter as it is possible to conceive, with the smallest admixture of animal matter, such, for instance, as the tears, mere brackish water. The pain of tooth-ache will sometimes produce a natural insalivation; and water as pure as tears will stream from the mouth. The cellular tissue is ever ready by any bodily exertion, to pour this aqueous matter through the skin in the shape of perspiration. But let us reflect on what state of perspiration some persons are subjected to; the greatest, perhaps, are the coal-whippers, who work only in their trowsers; but their labour is so immense, that I have seen them in puddles

of their own sweat ; and while the dust of the coals continually powdered their bodies, the streams of perspiration ran down, striping them like zebras. Can physiologists for one moment justify their assertion, that this immense sweating is a robbery of the blood ; and that it is made from the minute arterial vessels they speak of ? Why the very largest vessels in the body could not make the quantity thus exuded ; and if they did, in what condition would these coal-whippers be in at the end of the day ? On the whole, their muscular power is more developed than lessened. There is no ingenuity in the world that can justify the present belief. Fat forms about the 'twentieth of the weight of the body, and contains much hydrogen and carbon ;' this is all true ; but then physiologists say, 'it repairs waste, as is seen in hybernating animals.' Now this cannot be ; for during the winter months these animals waste in every way, both in muscle and fat. The great mistake made in all this, seems to me, to be the wrong estimate taken of the uses of the fat. It is said that it is wanted for combustion. I should very much like to know how this is done, for I never could understand how combustion of such fluids could occur. Are there some internal stoves everywhere, for the due formation of sufficient caloric for the uses of the body in its living state, to burn this up ? The next is the prime use made of the fluids, for it is impossible for animal life to exist without them ; so that a long hybernation is merely that time, in which an animal can live by its own caloric and moisture, in a perfectly quiescent state. When it ceases to do the former, or has not enough moisture within itself, the natural conditions would be fever and death. Now why does not the blood continue to make

fat during hybernation? Simply because it is too plain that it cannot do so. Some will say, it is because the animal is not consuming any food, and therefore no new elements of fat are taken into the system. This is poor logic; for on the other hand, the animal has no stools, and it would be as natural to say how can it exist without any actions on its bowels. Physiologists somehow approach the truth even if they do not get hold of it; for they say that fatty acids are a combination of *the oxygen of the atmosphere with the hydrogen*. Now we know where the one is obtained, but where does it get the other except from the body itself? This I have shown to be the prime use of the fæces to furnish; and that it is the combination of the hydrogens made by the body, meeting oxygen everywhere, except in the colon itself, that an immense amount of aqueous fluid is formed in the body in every twenty-four hours; which is as clear as noon-day, never was eliminated from the blood. Now let us go one step further. Fluids in the body have a great tendency by natural law to condensation, and nothing can be more easy of solution than those which are formed by the union of the oxygen of the atmosphere and the hydrogens of the fæces, mixed as they are with carbon and other animal matters to do this; thus forming adeps or fat as an inorganic mass, *entirely independent of the blood*. Thus Nature, having made this store, so condenses it on those parts only where it is required, and where it is not, she prevents its deposition. She therefore excludes it from the lungs, the liver, the spleen and the brain; and probably other parts, but these principally. If, however, physiologists will still teach the doctrine of its being a formation from the blood; why does not the

blood, going to these parts which are known to be excluded from fat, deposit fat there as well as at other places? They say also that it supplies waste; when in truth it also prevents waste. This is why fevers have never been properly understood. Directly a fever sets in, that moment there becomes an absorption of fat, with a consequent loss of the aqueous supply to the body. This is very different to combustion, which I deny altogether, as untenable. Nature, therefore, endeavours by conserving the fæces, to get all the hydrogen she can; but oxygen being in excess together with carbon, little or no moisture is made; while fatty depositions cease all at once, notwithstanding that the blood remains exactly what it was in every respect. Now, as soon as hydrogen can be formed in sufficient quantity for the oxygen taken into the body in every way; then these gases meeting in due proportions, aqueous fluids are again formed, and fatty condensations take place; and then the fever subsides as a natural sequitur. I ask those who have watched fevers with observing and scrutinising eyes, and witnessed the shrunken aspect of the patient, just at that time when the fever has somewhat abated in its character; how sudden an alteration has taken place, so that they have almost involuntarily exclaimed, ‘The patient looks better, he will do now.’ Are these changes then due to the blood or to the gases? I maintain the latter; for it is to them and their equilibrium of action and union in the system, that the drawn sunken countenance becomes fuller; and that they again form those fluids which are, and always must be made by them, independently of the blood. As the patient gradually recovers and puts on a plumper appearance and aspect, it is due to the inspissation of

these fluids forming fat in cellular tissue, and round about the glands; but which nevertheless in itself is always changing in character. It is in fact the matrix for the diluents which nature is always making and always requiring, and which holds them, stores them, and only parts with them, to suit her own purposes by her own wise laws.

I will further illustrate these facts in my next.

November 20, 1865.

LETTER XXX.

SIR,—To continue the subject of the fat in the body from my last. It is fully admitted that the oxydising processes in the system are very great and continuous; then, if this is the case, there must always be opposing elements in the same proportion; oxygen and carbon would soon wear and burn the body up, if it were not for the hydrogen. Now as we live in a gaseous element, the very fact of this wonderful organism of gases, which is perpetually changing and producing the phenomena we see, of wind, rain, storms, snow, lightning and thunder; yet it is always returning to a state sufficiently fixed, for animal and vegetable life. Besides this, it exercises a pressure on the body of fifteen pounds to every square inch; so that it would seem, that much oxygen must always be actually forced into it. The resistance to this must be, what the body makes within itself. Now, as chemists can reduce all matter to certain component elementary parts, uniting in certain atomic proportions; I cannot but wonder at the silence on the subject of the actions of the gases in

the body. I have therefore suggested the idea of many fluids having their origin in the body, independent of the blood, to the refutation of the belief that they are produced from the blood; which appears to me untenable and impossible. Our latest writers on the nature and formation of fat say, 'All fatty acids combine with a base to form a soluble compound.' Well, this we will imagine as near an aqueous one as it is possible to be, because they go on to say, 'This is carried into the blood, where it is again formed into an insoluble compound when it is deposited as fat.' Now, 'how in the name of all the gods at once' can an insoluble compound permeate such membranous structures as the arterial by exosmose, and this substance too, to be fat? It is quite a gratuitous theory, and quite incomprehensible and only made to uphold the fixed idea, that every element must first go into the blood for every other element to be made from or out of it. It seems to me a very roundabout way for Nature to do very simple things, when she can do them so much better and easier, and does so, whatever physiologists believe or say to the contrary, as I have already set forth. Now, I apprehend that the real positive fatty elements of food are used more by her to make hydrogens in the system, and suspend and retain them; or she would not have been so careful in her provision of forming bile to saponify them. These saponaceous or fatty particles hold immense quantities of hydrogen; so that uniting with oxygen in the alimentary canal, even in the state of new ingesta, may actually double or treble the quantity and bulk of the chyle; thus enabling the small intestines in their knuekling and millstoning proecess, to press into the lacteals all the necessary

elements to be derived from the whole mass ; while, on the other hand, all the insoluble portions are carried into the colon, where oxygen does not permeate. The very fact of the solid masses sent there becoming fæces, immediately make a large quantity of hydrogen ; which by exosmose passes through the membranous coat, and then meeting with oxygen and carbon, aqueous elements are formed, and become condensed wherever they can be deposited, in the shape of adeps or fat. There can be little doubt, as physiologists say, that fat is a sustenance of the body, and the more oxygen there is consumed, especially in summer, the fatter the body becomes ; and that the concentrated cold air of winter consumes it more rapidly, and the body gets thinner. Now here again physiologists spoil everything, and refute themselves ; for they say, ‘ These facts show that the influence of the fat is to *supply the blood, when destitute of combustible materials, with a quantity of fuel for combustion.*’ Can anything be so irreconcilable with common sense ? Really this fat is made to do such strange things, that if nobody ever heard of it before, instead of its being an ingenious theory worked into the minds of men by degrees, and there finding some repose ; they would be perfectly astounded at it. What a combustible material the blood must be ! But I deny all these doctrines *in toto*. Let me only refer to the character and constituents of the blood corpuscles, from whence it may be supposed the fatty deposits are produced. Their chemical composition in 1,000 parts are, water 688, and solids 312. Of these solids, globulin claims ninety and hæmatin five per cent. ; the remaining five per cent. consists of fat, extractive and mineral matters, and salts. The fat is

small in quantity, but yet larger than in the liquor sanguinis. The principal acid of these corpuscles is phosphoric, and the principal base is potash, which no doubt keeps the fat saponaceous. So that if we divide the fat, extractive and mineral matters and salts into equal parts; we find one and a quarter of each for every 1,000 parts; scarcely an eighth per cent., to be the prime depositor of one-twentieth part of the weight of the body. Taking all the circumstances together, I think this a very convincing proof that the fat cannot be formed from any deposition or exudation of the blood. It appears to me, that what there is in the blood, is only in sufficient proportion for the necessary lubrication of the vessels themselves through which it passes; and only sufficient to justify physiologists in saying, that it is one of its elements or constituents, and no more.

The fact explains itself, that if the body makes more fluid in the summer, and has greater powers to store it by inspissation, in the form of fat, than in the winter; the greatest real combustion which is always taking place, is by the assistance of the gases; their rapid union and various formations; the resistance they offer to atmospheric pressure by actually absorbing it and using it; and all this too outside the blood vessels, and not in them; in fact, having little or no connection with the arterial currents. There is no doubt but that oxydising influences take place within them, as well as everywhere else; but the two actions are distinct. This is shown particularly at their terminations, namely in the capillaries; which will not pass blood without oxygen, and oxygen is the natural stimulant of the veins. In all their imaginary circumlocution of fatty

deposits and how Nature acts, physiologists conclude by saying that, 'At any rate, however far we may be from comprehending the exact nature and seat of these changes, there can be no doubt that starchy and saccharine food is capable of being converted into fat.' In this I think nobody can differ in opinion. But if we can only get adeps or fat by consuming fatty and oily things, or those which produce fat; we have a right to ask where the vegetable kingdom, which produces such quantities, gets its fatty or oily matters; whether it be a cereal, or a tree, or their seeds, such as linseed, colza, &c. How are these obtained? Not as is inferred by the physiologists as to the body, by being manured with oil and fat; but by that peculiar combination of the hydrogens, carbons and oxygen, which we see in the natural combination in these plants to produce them; and which are the very self-same processes that are performed in our own bodies, independent of our diet, which must be admitted assists largely, but does not wholly cause the secretion. Some persons are careful not to take the slightest portion of fat in their food; yet they cannot eat anything without getting its elements. Fat must therefore, in the healthy body, be always in a mechanical condition, easily acted upon both by heat and cold. It forms in every part of the body the nucleus of moisture; and holds within it the ponds and lakes and standing waters which are its inorganic fluids, and which are absolutely necessary to it, independently of all blood currents. As an inspissated mass, it is at all times ready for reduction to a fluid state; an act which is the very opposite to combustion. It is the great sponge or filterer of fluids to absorb gases and to exhale them. Being rich in

hydrogen, it absorbs the oxygen and becomes a fluid. The electric heat given out in all their unions produces carbon or warmth. Along the nerves it constantly supplies that moisture which is wanted for their electrical actions, as much as the fluids in galvanic troughs. How deficient are patients under fevers of nervous powers or sympathies; and in delirium from want of these fluids, sensation ceases, and the nerves are powerless to feel or appreciate. The soft, unctuous state of all our tissues, serous and mucous membranes, fasciæ and interstices; all show the value of the aqueous matter from fatty deposits. But to say that all this is a deposit from the blood, when the system has the same laws and power of using them, and consequent means to make this adeps independently of the blood, equally as the plants and cereals; is a mere assumption, and the sooner it is banished from physiology, the sooner will some truth dawn on the principles of life.

The actions of the gases of the body, for which I am contending, are ill understood. Even the blood is imperfectly known, for it has evidently given to it, too much to do. Rich as the arterial circulation is, with all matters to preserve and renovate structure, it is to me an impossibility, that it can deposit fat and make secretions as well. We give acts to vegetation from certain elementary laws, and deny the same to the body, which has precisely similar ones for the same purposes. We admit one can do a thing, but that it is done by a different law in a higher organism; while the same laws produce precisely similar results. The heart cannot act without its due supply of lubricating fat or grease; hence it is always well supplied with fat on its upper portion; nor can any other muscle. The highly

sensitive state of the body could not exist without an immense supply of fluid independent of the natural blood currents. Unless a large amount of fluid was made in the body independent of what we drink, neither digestion, chylication, nor appropriation could go on. The changes which take place, of conversion from albumen into gelatine in the mesenteric glands, could not take place without independent fluids. Nor could the salivary glands eliminate their secretions without them; and lastly, the organic secretions of the kidneys from the arterial blood, could not pass out of their pelves without the assistance of large quantities of inorganic fluids from their fatty surroundings.

The amount of fat in the body and the general plumpness or embonpoint of individuals, are always in ratio to the size and calibre of their colons. The fæces being the prime producers of the hydrogens; it is seen that thin persons do not make so much fat, simply because their fæces have not so much room to act, nor are their colons expansive enough for the generating of this gas. They have upon a broad principle a more conserved and constipated idiosyncrasy; still they make enough fat, and consequently enough aqueous matter for all the purposes required. Neither do they as a rule, perspire so much as the fatter individuals; but are nevertheless equally healthy, wiry, and long-lived. The gradations in size of individuals depend upon the colons, and those with prominent Falstaff abdomens, show them to have large colons, especially transverse arches of that viscus. They are more dependent for this bulk on the calibre and size of the colon, than on the stomach, duodenum, or small intestines. Even if they have, as they really do, more actions on their bowels

than the thin wiry subjects, still their fæces exhale more hydrogen, and they absorb oxygen more readily and in far greater proportions. It seldom happens that individuals of this character, have less than two actions on their bowels every day and often more; while they secrete saliva, perspire, and micturate in proportion. They lay up great stores also of fat everywhere; such as in the omentum and about the kidneys and glands. I have long come, then, to this conclusion, that the fatty and oily matters we consume, are necessary to attract and absorb the oxygen from the immense amount of hydrogen they contain; and that these form additional aqueous fluids in the processes of digestion; while the refuse from these processes goes into the colon to help the fæces in the formation of hydrogen; which by exosmose, permeates it throughout all its wonderful length; and as there is no oxygen in the colon, the quantity of hydrogen generated there is something enormous; were it not for this, as well as the other gases, such as sulphur, phosphorus, &c., we should not have the animal and vital life and existence which we now exhibit. It is for purposes of the kind above stated, that the Esquimaux and other inhabitants of the Polar regions require so much blubber. On the other hand; instead of the fat which we take in our diet, making fat in the blood, and the blood depositing it; which I hold to be a false theory from beginning to end; the fat is an extraneous deposit from the sources I have herein set forth. Other uses of this wonderful and beautiful structure I shall reserve for my next.

December 6, 1865.

LETTER XXXI.

SIR,—I have shown in my previous letters, that large quantities of aqueous fluids are made in the body independently of the blood, and that these stand in close relationship to the fat. That while on the one hand, fat is made by the inspissation of inorganic fluids formed from certain gases; on the other, it has of itself when so formed, the power of holding a large quantity of fluid as a reservoir in many parts, for the common uses of the system. In none probably is it so important as in its connection with the glandular organs, which have large powers of secreting important salts to be used again in the system, and which are deeply imbedded in it. It is my duty to show, that it would be perfectly impossible for the salivary and other glands to form their peculiar secretions without the inorganic fluids supplied by the fat; and furthermore, that it would be equally impossible they could be conveyed from their secreting cells without being diluted with inorganic fluid elements. It seems to be so deeply a rooted conviction, that all elements are made from the blood, that I cannot reiterate my denial of this too frequently. Nature, having placed certain organs and structures of a certain character in given localities, has consequently endowed them with their own peculiar powers. Nothing can be more remarkable in a physiological point of view, than that periosteum secretes bone. Plant the periosteum where you may, the result will be ossific deposit. If bone is destroyed and becomes exfoliated, a fresh periosteum must be first formed, before that portion of bone is renewed. The blood, therefore,

supplies only structural power to the periosteum, and periosteum supplies bone. Similar facts occur throughout all other structures. Blood supplies glandular structure only, while the glands from their own resources secrete certain elements. If we take the salivary glands alone and consider the immense amount of saliva that is formed daily by every individual; the wonder is, not how the glands can do it, but how the blood can supply sufficient organic basic elements, as well as the inorganic aqueous matters for their dilution. And so it will remain to the end of time, unless the question is solved in a more simple manner. In all analyses of these secretions, a vast percentage is always found to be water, which holds in solution their constituent bases. The salivary glands themselves evidently form these latter; but it is totally impossible they can also form the aqueous, or diluent, portion as well. Therefore, this is supplied by the inorganic fluid derived from the fat, which in the first place helps them in the formation of their bases, and adds the principal quantity of fluid when these are excreted from the glands themselves. There does not appear to me a wiser or more beautiful provision of Nature, than in the gland theory viewed in this way. It opens up a large field of thought, and at once relieves us from the oppressive idea, as well as the impossible one, that the blood is the only active medium in all these matters.

Let us see how modern physiologists view these things. They say, that the secreting glands of plants are presumed to be structures specially adapted for the elaboration of secretions; but yet they profess not to understand them. They infer, that a peculiar condensation of tissue secretes a fluid, and then excretes it in as

peculiar a way; and suppose this process to be connected with the vascular system in the interior of the plant. In fact, all being doubt and uncertainty, specious theories are made; but always with the plea that this or that fact has not been '*sufficiently investigated*,' or '*not sufficiently revealed*,' and, therefore, '*not yet understood*.' Thus, implicit faith in much of our present physiology reigns supreme. But once shake this by a little common sense, and it will crumble to pieces. A rotten foundation never did, and never can, support a solid superstructure.

Speaking of the acid and alkaline secretions supplied by plants, 'we know,' say the best authorities, 'scarcely anything.' Still they are always harping on the same string—namely, that all secretions, glandular of course included, must be eliminated from the blood. But if anyone once begins to investigate all these matters with a doubt, as to how it is possible these things can be done, it is then that the more he reads up the subject, even by the best authorities, the less satisfaction he will obtain; his doubts will at last culminate in thorough disbelief, and he will arrive at the same conclusion I have long since, of the speciousness of the theories advanced.

Now, one fact of this kind is as good as a thousand, and I will take it from the latest, as well as what is considered the best authorities. In speaking of fat, I have alluded to its investing membrane, which is an organised substance, whose duty is to envelope a large inorganised mass, and for no other purpose whatever. Of the same character are the fasciæ of glands. Speaking then of the glands, our authorities say:—'In all cases, the secretion is formed by a special organ or

gland, more or less complicated in structure; it may be regarded as a sac, formed of a membrane, on the outside of which blood-vessels ramify provided with an orifice, by which the contents may be either transmitted to the place where their presence is required, or carried out of the system altogether.' '*It is the membrane of which this sac is formed, that constitutes the true secreting organ*; and, although our means of observation, do not at present enable us to distinguish any marked differences in its structure in the different glands, it is *manifest* that such variations must exist; since the conformation of the secreting sacs, or tubes, into masses of various shape and texture, has nothing to do with the character of their products; this being entirely determined by that of the membrane, through which they are transuded from the blood.' 'It is not a little curious to remark, also, that all the secreting membranes of which glands are formed, are prolongations either of the skin, or of the mucous membranes, which are continuations of it.' 'A secretion of a more peculiar nature is formed by one of the modifications of cellular tissue, *the adipose*; the fatty matter which its vesicles contain being strictly a secretion *from the membrane forming their walls*, and as these cells have no outlet, their contents are stored up in them, like the corresponding secretions of plants, until their re-absorption is required for the purposes of the economy.' So, in the first place, the '*secretion is formed by a special gland, with an orifice to transmit it where it is required, or to carry it out of the system altogether.*' But if it is required by the system, it goes to the right place, and if it is not, it somehow vanishes. This is very pretty logic; as if Nature ever made any-

thing that she did not want, and always for some specific use. But then the sac or investing membrane of these glands is considered in the next paragraph 'the true secreting organ.' Now, this is quite of a piece with the other. Then I say, why this work of supererogation at all? The sequitur is quite natural, the confession of not knowing how all these things happen, though it is naïvely added, that it is *manifest* something does happen. Then to say—'the various shapes and textures of the sacs and tubes have nothing to do with the character of their products' is equally gratuitous: for, did they not, Nature would not have made them so. But that, 'all the different products are entirely determined by the investing membrane through which they transude from the blood.' Yet, this is actually written and firmly believed in, with all the rest which I have quoted above. No wonder medicine is a mystery, and its practice oftener a curse than a blessing to mankind, when the physiology of its simplest secretions are not understood, and this *half-science* itself in so low a condition. Let us trace a number of causes to prove one great fact. A thin girl marries—conception takes place, with gradual utero-gestation. The first thing noticed, is a general plumpness occurring throughout the body. In fact, the whole character of the individual becomes altered. The neighbouring organ to the uterus, namely, the colon, increases in calibre; more hydrogen is generated and oxygen is proportionally consumed, and more aqueous elements are the result: so much so, that in a few months, a greater deposit of fat ensues from the causes I have laid down. Every gland becomes more active, and is able to secrete more of its bases of supply, and the surrounding fat supplies

also more aqueous diluents. The sympathies throughout the whole system are roused to their utmost; and, for the first time, the breasts assume a character they never had before. They enlarge, and after parturition secrete milk, often in very abundant quantities. Now, here are glands different in their character to the salivary. It is a fact noticed by the older physiologists, that the milk glands, or rather the membranous fasciæ that invests them, have very few blood-vessels compared to their bulk, and even with the great increase of the mammary glands during lactation, the arteries preserve their almost capillary minuteness throughout all their ramifications. Now, this fact is totally at variance with the opinions above stated. If there was any truth in them, then the blood-vessels in the investing membranes ought, as a matter of course, to become larger and carry more blood to the parts; which they do not. But as respects the milk glands themselves, they become larger and more active, and the quantity of fat itself surrounding them is greatly increased. Still the older physiologists worked hard for their theories, by saying, that the milk was extracted from the chyle; but this reversion of the lymphatic streams being justly considered untenable, they, like all others, fell back upon the blood. It will thus be seen that when men wish 'to reckon without their host,' how they fall into no end of errors, only to be equalled by their ingenuity in doing so. The host in all these cases being the gases of the body, has been left out altogether. Nothing appears clearer than that the solids, fluids, and gases form the most perfect equilateral triangle; and if once this third side be admitted into all the laws of the secretions of the body; mountains of vexed questions would soon

vanish from the field of physiology. Milk may be considered as one of the most compound of animal fluids, whose parts have but an imperfect affinity to each other. It contains but a small quantity of azote, with a predominance of hydrogen, oxygen, and carbon; but it also contains several salts, such as muriate of soda and potass, and phosphate of lime. Now muriate of potass does not exist in the blood; and this led some of the older physiologists to doubt the blood supplying the mammary glands at all, with the materials whence milk is secreted. And this is the most consistent view of the whole matter; for there is no doubt in my own mind, that the organic constituents of the body have been too much considered, and supposed to do more than it is possible they could do, to the exclusion of the inorganic elements and the gases, which have been entirely ignored. The consequence is, that most untenable doctrines have been promulgated, which have only served scholastic metaphysicians to lecture upon even in the present day, to the wonder of their hearers only; for while they have endeavoured to retain all these matters in their minds, they have felt they could not do so, for the simple reason that they contained no truth for the mind to grasp.

A distinguished chemical physician, lecturing on fat, says, ‘that the process of fattening is caused either by taking more fatty matters into the system, than can be removed by the influence of oxygen; or by diminishing the quantity of oxygen supplied to the tissues.’ There is truth at the bottom of this, but it is not made apparent by scientific deduction. He must first teach, that nothing can be taken into the system which does not undergo the necessary changes to their primitive elements,

and then become recombined or organised anew. Let him teach, that the hydrogens are generated to a large amount in the system from the fat taken, and consequently absorb the oxygen freely. The natural results being aqueous elements, which become inspissated, and fatty deposits necessarily ensue. When there is a diminished supply of oxygen to the tissues with a full supply of hydrogen, then greater quantities of fat are the sequence. But let him give up the false idea, that either eating fat itself, or fat-producing elements, supply fat *per se*; for they do no such thing. This can only be done in the way I have previously said, by their conversion into hydrogens, and then combining with oxygen and carbon. Much of the oxygen becomes consumed, and a hydro-carbon is left; hence the fat. Many persons to my own knowledge who are great consumers of fat, never make fat, nor carry fat in like proportion.

The further uses of this valuable inorganic mass in its relation to the glands, for the formation of diluents, to assist the bases of their secretions in the economy of the system, I will further illustrate in my next letter.

December 13, 1865.

LETTER XXXII.

SIR,—The fact of all those glands, which are intended by Nature to secrete elements to be used again in the system, and according to their character and position being of very varied shapes and forms, as to lead to their being called complicated; shows that they are designed for manifold purposes, and these are both of

an organic and inorganic character. Organic, because they secrete vital elements to be used again; and inorganic, because they use up, and otherwise appropriate a vast amount of non-vital elements; which are equally essential to the economy of the system. That they do this, is shown by their structure being permeated by laminae and fasciæ—which are, ‘prolongations of the skin or mucons membranes,’ all these parts being provided with ducts, to carry the combined secretions away. All this shows two distinctive actions most clearly and unequivocally. The first, that secretions are made from the glands themselves, which are basic salts; and secondly, that these are diluted with inorganic fluids, supplied from the fat which surrounds and permeates them everywhere. Now, fat in the living and vital state is kept in a semi-fluid condition; the more aqueous parts of which are constantly passing off in union with the true glandular secretions; while the more solid are maintained for the further formation of fluids. If this were not the case, it would be useless for the glands to secrete at all; for their elements could never get away. To show the impossibility of the blood being able to supply the diluents for this purpose, it has been calculated, that there are from fourteen to twenty-eight pounds of blood in the body, more or less, which takes about three minutes and a half to make its circuit—that is, by the arterial circuit distributing its structural properties, and the venous blood carrying the residuary mass into the system again. Now, if, as is supposed, fourteen pounds of saliva alone are secreted in the body every twenty-four hours, how can this be obtained from the blood? Its natural currents would be stopped in a fearfully short space of time.

Where, then, do other aqueous secretions of the body, of equal or even greater quantity, come from? Surely not from the blood! Yet, in face of all this, physiologists persist in saying, ‘all secretions come from the blood;’ but add, ‘that it is a singular fact, that new chemical compounds are formed in the secretions, which are not known in the blood.’ No wonder everything is so apparently mysterious and singular. Not, however, in natural laws, these will always prove to be simple and clear, as soon as they are properly elucidated. That which is really mysterious and singular, are the theories and dogmas of schools; which I defy anybody to comprehend or understand. Now, it is well known, that if meat is deprived of its water, its valuable properties are destroyed; for in this case scarcely a fourth of its bulk and quantity would remain, and that which does, would be horn-like, tasteless, and perfectly unfit for food. Not less than three-fourths of the substance of animals and vegetables consist of aqueous diluents, which gave rise to a celebrated chemist’s remark, ‘that a man’s body might fairly be represented by a bucket full of water, with a lump of chalk, and another of charcoal.’ Thus, as I have previously said, the body must have powers to make its aqueous matters, independently of the blood. But the gases, having been ignored in a physiological point of view, and these being the only means by which these ponds and lakes and rivers are kept up, we have as a sequitur, the thousand false doctrines and dogmas, stopping the way to our better understanding the economy of Nature. I have endeavoured to show how all these matters can be made more consistent with truth, by the natural formation of fat; by

that fat being a retainer or reservoir of the fluids; by these fluids being the natural diluents of the basic formation of glands, and all those other elements made in the body to be used again by it, in the most consecutive and regular manner, entirely independent of the blood. But I will now show that there are other organs which secrete basic salts, and which could never be eliminated from the system, unless it were for the presence of their natural inorganic solvents and diluents. These organs are the kidneys; and their secretion is the urine. Here again, it is most implicitly believed that all the urine is secreted from the blood, and there is no greater Medical heresy than to believe or assert anything to the contrary. Endeavouring to prove a bad argument, it is extraordinary what books tell us. That the rapidity of the blood circulation, is sufficient to account for the shortness of time, in which certain fluids reach the kidneys. Then again, it is said the kidneys are of a duller sensibility, and less energetic than other glands. Owing to the rapid passage of fluids through the kidneys, some other physiologists supposed a direct communication with them and the stomach. Anon a host of chemists injected the veins with the prussiate of potass; yet the astonishment was great, because it could always be found more in the urine than in the blood. Even coarse injections pass readily from the renal arteries into the ureters; and so they do into the veins as well. This was said, to show the rapidity of the kidney circulation, and the *possibility* of a sort of filtration or mechanical separation, of the more aqueous portions of the blood. Then it is admitted that urine is the most complex in its elements, and most variable in its qualities of all the animal fluids. Foreign sub-

stances appear in it, and even change its composition, and other fluids may disguise it altogether. Bile, fat, milk, blood, pus, appear in it; and so it is said, the kidneys *reason less* on the sensation produced by the various substances in the blood, but often allow them to pass in a pure state. In short, the ancients considered the urine as a sort of extract of animal substance, carrying off all that is impure in the animal economy. Then, again, modern chemists say, that it is not merely the abstraction of a quantity of water and salts accumulated in the blood, which the kidneys perform; but that a chemical change is produced by them, either upon the whole blood, or some important parts of it. Even in a case recorded in the last century of an individual's bladder being turned inside out; so that the flow of the urine through the ureters was watched, as well as the quantity and quality of the urine. In this there was noticed great differences, according to the state of sleep and waking, and the quantity and quality of diuretic drinks. With all this, none could understand exactly the reason why such differences occurred; yet still it was believed, as it is now, that everything goes through the blood in some way or other. It never occurred to any physiologists, ancient or modern, that there could be two natural supplies from different sources, to make up the one urinous current. Notwithstanding this, it has been noticed, that the urine in the ureters is turbid and imperfect; and the constituent parts, not thoroughly blended together, though it improves as it passes those ducts. One would have supposed, that these discoveries might have led to several other sources of supply; but it shows when the mind is warped, how many subterfuges supply a given philosophy. The passage of the urine

down the ureters, and the peculiar situation of these tubes in the musculo-membranous portion of the bladder, with the weight of the secretion above rendering the ureters always full, and one drop pushing another out into the bladder; never seemed to offer any suggestion, that the due mixing in this passage from the kidneys to the bladder of the organic salts with an aqueous inorganic base, were, or could, be derived from two distinct sources of supply. Nor in the formation of these organic salts with their inorganic fluids, passing through the ureters, and then mixing again in the bladder, could be at all influenced by the mucous membranes of either. All these fair subjects for research and inquiry, appear to have escaped observation entirely. The only philosophy permitted being, that the kidneys purge the blood of something, which would otherwise be deleterious to it, and the economy of the body generally. There is no doubt, that urea is in a great degree a necessary element of the blood. It seems from the very position of the renal arteries, that it is necessary to all the organs above them. For instance, the ascending aorta must carry to the contents of the thorax and the brain these essential elements; and the descending aorta doing the same to all the organs supplied with blood, above where the renal arteries are given off. But below the renal arteries the only organs to be supplied are the genital. There are no others below, compared to all above the renal; and no doubt the genital organs and lower extremities take an equal share of this property of the blood. But if it were not for the renal arteries, there would evidently be too much; therefore it is, that the kidneys are provided to abstract this extra quantity, and so relieve the system.

But physiologists are not satisfied with this; for they say, the kidneys take all the urea and other salts from the blood, and somehow purge and purify it. If they really did this; I have calculated, that we should require at least three pairs and a half of kidneys, instead of only one pair. One pair, for instance, ought to be situated immediately on the ascending and another on the descending aorta, and others elsewhere; but as this would be multiplying organs too much, there ought, then, to be three or four pairs of renal arteries from the above situations, going to one pair of kidneys. I am merely showing the absurdity of the idea of what the kidneys with their present one pair of small arteries are supposed to do. Then, as to the urine itself, its difference, variety, and quantity does not depend on the blood circulation nor on the drink taken. Some persons are accustomed to make considerably less urine in comparison to the fluids they take; while others, on the contrary, make a considerable quantity more. Now, the kidneys are differently placed as organs secreting elements to be eliminated from the body, to the glands which have to secrete elements to be used again. These latter are so situated, that they are constantly excited to action; while the kidneys are placed out of the way of all the chylipoietic viscera; and are so shut off from them, that they should have nothing to do with these acts, and moreover, are surrounded with double and treble the quantity of fat to other glands. Whatever volume and quantity physiologists have given to the blood going from the renal arteries to the kidneys; they have done equal justice to the volume of the residuary mass coming from the kidneys by their proper veins; and have shown, if anything, that this mass is the

greatest of the two; therefore, the system makes use of this diluent, minus its urea and other salts which the kidneys have extracted. The great fact of the highly-congeried state of the renal arteries ramifying in the kidneys; shows that they could not secrete the urea from this part of the blood, except under very great pressure; and that they do this and leave other elements, clearly shows that we do not yet understand their true mode of action. What elements they do secrete, pass through the bodies of the kidneys into their pelves, and must be of a highly concentrated character; for the veins have evidently run away with all serous elements and liquor sanguinis, and there they would be left, if not released by other supplies of fluid to dilute and carry them off. The manner of their doing so, I will explain in my next letter.

December 20, 1865.

LETTER XXXIII.

SIR,—If we take a sheep's kidney, for instance, enclosed in fat, it will be found that the cortical part is least covered; indeed, in many cases this part may be seen through the fat, while the largest and densest quantity is always on the opposite side. This side is very different in shape to the cortical, which forms a half circle, while the other forms two, with a much depressed centre; representing a comparison between the natural appearance of the nates and the anus. If care is taken in making a clean section through all its substance, from the rounded or cortical side, down to these

parts, and a perfect incision of the calices and pelves made, without cutting through the entire kidney, but leaving a hinge about the contracted portion, we find just within the pelvis a small piece of fat. In the dissection of this, there will be found some hard semi-cartilaginous bands, surrounding this fat. It has been noticed by casual observers, who are fond of kidneys; that if this part, including the pelvis, be cut out and put into the mouth and masticated, this cartilaginous substance is very apparent. Many persons cut this away entirely and leave it; others cut it off first, masticate it, and put out the hard mass; but it is patent to everybody, whether he is or is not an anatomist, that this semi-cartilaginous substance is always present. It will also be noticed, that there is a true skin or fascia to the inner side of the investing layer of fat, as well as another true skin to the kidney itself. The fascia, or skin of the fat from all these parts, concentrates round the two nates; and becoming thicker and denser as they dip into the anal portion, they thus, as it were, secure a free fatty communication with the whole bulk of fat within. It matters not whether it is a single kidney like a sheep's or a pig's, or the many lobulous portions that make up the kidney apparatus of the bullock. The pelves of each have a direct fatty pith going into them, which is secured and protected by the cartilaginous arrangement I have mentioned. This at once shows, that there is a communication from the body of the fat, and that much of the aqueous portion of that fat is continually flowing into the pelves of the kidney at all times. This being an inorganic fluid, is provided by Nature to mix with the small quantity of organic salts, the principal of which is urea, formed

from the blood in the cortical part of the kidney, and deposited in its pelves. According to the pressure of the surrounding fascia and skin of the fat enveloping the kidney, the aqueous matter therein contained, is pressed through its fatty funnel into the pelves, and so dilutes its salts. The structure here resembling the nates and terminating in the anal portion, shows a funnel-shaped formation, which assists the filtering of the aqueous portions. The provision of the semi-cartilaginous rings, are similar in use to the cartilaginous rings of the windpipe, and prevent the communication between the pelves of the kidneys with the great body of fat from being closed or interrupted. It needs no speculation of diuretic drinks exciting the kidneys to greater action; nor of any distinct communication from the stomach or anywhere else direct to the kidneys, to account for their excessive or often rapid action. No fluids which we drink, in any quantity, can of themselves go direct to the kidneys; nor, as physiologists say, first into the blood and then into the kidneys. Our arterial blood keeps up its normal quantity, and pursues the even tenor of its way and its circulation. But into what a disturbed state would the body soon get, if it was to be increased so inordinately by the fluids taken into it; to be again decreased, in a corresponding ratio, by the action of the kidneys! For the kidneys, like the blood, pursue the even tenor of their way; and only do what is required of them, and that is, to remove what urea is not wanted in the lower extremities. This fact must always be borne in mind, that all fluids alter their character when taken into the body. It is not yet admitted that we micturate beer, or claret, or whiskey, or any specific fluid as it is taken into the system.

Here again the laws of the gases rise in judgment against our physiological dogmas. If more hydrogen is formed, oxygen is sure to come to its union, and these combinations always tend to fat formation by inspissation. But if, on the other hand, excess of fluids are taken into the body; many are resolved into their gaseous elements, and form other fluids, which become inspissated; while others, not going through this process, filter through the fat. Some passing off through the skin and cellular tissue, and the others through the pelvises of the kidneys. Hence it is that persons drinking largely, and having to micturate in proportion, pass through their kidneys large quantities of inorganic fluids. Some men I have seen pass several pints after a dinner, when the wine has gone round freely; and it is curious to observe, that if they can withhold the act of micturition, they can retain all the elements; but if once they begin to micturate; an exciting action having been set up in the surrounding fat of the kidneys, they require to relieve the bladder almost every half hour. Now, in urine thus made, there is very little urea; or in fact, any salts eliminated from the blood by the kidneys; thus showing that the blood is wholly undisturbed, or much influenced by these large libations. If we only reflected for one moment that all these pints of fluids—call it, if you will urine—actually came by elimination from the blood—in what state would the system be in, or into what state would it get? The question which naturally arises then, is this: Is the whole bulk of urine voided at any time, *a robbery of the blood*? The answer is, it cannot be! There is not a sensible man out of the Profession, or one not bound by any of its tenets, or physiology, that

can believe for one moment, that the urine as a combined organic or inorganic mass, is a *robbery from the blood*.

Let us take the three most distinctive characters of the urine, apart from its true and normal state, whatever that may be; which is quite unnecessary to particularise here. There is first, the urine which is sparsely secreted, when an individual can go from morning till night and not want to micturate. This is very moderate in quantity, and rather high-coloured, contains large proportionate quantities of urea, and blood salts, actually secreted by the kidney. Still, eighty or ninety per cent. is from the inorganic fluids filtered through the fat, and these fluids are more or less very pure in their character. Probably this condition has also been coupled with exercise which has induced an excess of radiation through the skin—in short, more perspiration. Here the fat has filtered the aqueous humours through the cellular tissues. Now, physiology does admit, that when an individual at times perspires more freely, he voids less urine. Here then we can make a fair physiological deduction. The second distinctive character of the urine is that, which seems to be passed tolerably clear, but of much lighter colour; but on cooling it becomes of a pea-soup consistence, deposits a large amount of lateritious and other sediments, and is made more frequently than the first. Now, does this show in its analysis greater organic elements, such as may be said to be eliminated from the blood? probably it may to some extent. But then, are we not to give to the inorganic elements which furnish its greater bulk, some share of these morbid products? The inorganic fluids must surely become at

times in a morbid condition; and instead of the natural filter, the fat, depositing a clear fluid, it will have mixed with it perturbed elements; therefore, this state of the urine as much depends upon this condition of those elements, as certain alterations of the basic salts, do upon the condition of the blood. Now, both these conditions of the urine are capable of being retained by the bladder. They do not press for their immediate voidance. There is an intelligence in the bladder itself which shows it can bear their presence during the proprietor's pleasure to void it. The third abnormal character of the urine differs in all this; it is that which is of a pale straw or citron colour, sometimes approaching even that of slightly tinted water. Now this has very little of the organic elements of the blood; and the kidneys themselves have had very little to do with it as secreting organs. This urine is made frequently and in large quantities, and what is more, cannot be retained. It is most irritating to the coats of the bladder. (Hence I have alluded in my preface to the variety and character of the mucous membranes. The bladder seems as unable to retain this kind of urine, as the colon its faeces, at certain times when bile is not present.) It occurs at such times when there is very little radiation from the skin or even a tendency thereto. Radial heat seems to have stopped from the centres to the surfaces, and taken that peculiar reverse action, from the surfaces to the centres. The consequence is, that the fat about the kidneys relieves the body of its surplus fluids, and filters them through these organs. Can anyone, however bigoted he be to received opinion, say, that this great quantity of mere fluid is a *robbery of the blood*? If it is, it must come

through the liquor sanguinis, or serum. Let me ask the chemist, whether he has ever found in this peculiar urine, any element at all resembling the serum of the blood; or that the serum of the blood could at any time furnish so pure an aqueous fluid?

Again, it contains scarcely a trace of urea or any of the elements of the blood. It could not, therefore, be possible for the kidneys alone in a few hours, to take such amounts of water from the blood, to the exclusion of the urea and other salts; especially when the offices of the kidneys are only to do this and *not to remove water at all*. The very construction of the kidneys shows this in a marvellous degree, and what Nature has alone designed them for. Their duty is simply to remove what is not wanted; but their other design is to be receptacles for relieving the body at certain times of the inorganic fluids; which serve also to dilute their own secretions, and which evidently could not pass without this provision. As we have seen in the third condition of the urine, which is only aqueous and almost purely inorganic in its character; the kidneys are a ready receptacle to pass off through the bladder what certain states and conditions of the body have wisely directed there. As this last condition is sometimes very troublesome, and when it continues inordinately, is often very weakening, the physician is called in to relieve the patient. Well, the simple remedy is immediate active physical exercise, to such an extent, as to use up these fluids, and by inducing perspiration, to direct them through the cellular tissues to the surfaces. But if this cannot be done, either from accident, old age, or impossibility of physical exertion; then to act on the mucous membranes and primæ viæ by gentle aperients.

The following extract is from one of our standard works, under the head of DIURESIS. ‘If there be an excess of urine over the amount of liquid taken, one of three explanations must be adopted:—

‘1st. Either the body becomes poorer in water, and so loses weight.

‘2ndly. Or, water is absorbed by the skin and lungs.

‘3rdly. Or, water is formed in the system by direct union of its elements, OXYGEN and HYDROGEN.’

I ask.—1st. From whence does the water come and how is weight thus lost?

2ndly. How can the skin and lungs make up the difference? For whether the escape is through the kidneys or dried up in the tissues, as in fevers, &c., why does not the blood immediately supply the deficiency?

3rdly. Here the author makes a ‘*shrewd guess*,’ and I have noticed a thousand times in reading physiological works, how near authors come to a great truth and let it go again. Simply because, that if followed out, it would break the great chain of sand they hold so fast by, and which they wish to keep as intact as possible.

I wish to show, that whatever I write has a bearing on the practice of Medicine. Let me observe, that in diarrhœas, how little urine is made, and that in cholera;—none! A person recovering from an attack of cholera; the first beneficial symptom is a return of the power to pass urine; and the worst symptom leading to an unfavourable prognosis, is the total inability to do so. And now let me ask, what is the state of the blood in such attacks of cholera? Is it possible, that in the almost anæmic condition of the patient after such an attack, and the great loss of fluids generally, that the

blood could bear the *robbery of the urine*, supposing, as it is asserted, that the urine is entirely of itself a secretion from the blood? The smallest reflection brought to bear upon all these facts, must show the fallacy of the present doctrines of the kidneys, and their supposed secretion of all the elements that pass out of the bladder. I have long looked with some degree of mistrust on all these things, when I have passed through the wards of our hospitals, and seen the numerous test tubes and apparatus for testing and trying the specific gravity, &c., of the urine, of all the patients. Nevertheless, the physicians must believe that all they see there, in every case they test, shows the condition of the organic blood elements alone. While they have not the remotest idea, that many of the departures from its normal standard are due to the inorganic elements, or the watery supply from the fat; from which source, they will some day find many of the abnormal elements to come; such as albumen, &c.

The facts I have now mentioned, have evidently never occurred to their minds; for they seem to have taken no consideration whatever of the inorganic elements of the body. Nor have they ever thought how much every part of the system was indebted to them. Nor to the sources from which they were derived, or the uses to which they were applied. Nor to the gases to which so much vital power was due. Without all this and more, I tell them they will never be able to make head nor tail of disease, nor ever find out its laws; for it has laws, as everything else in Nature; nor can they ever pretend to treat disease in any scientific or certain manner, until they sweep away and abjure many of their darling tenets, and begin afresh to un-

ravel the great principles of life ; which a severe study of physiology can alone impart.

December 27, 1865.

CASE OF FEVER AND ERYSIPELAS.

The following letter illustrates the treatment of the above case, according to the principles laid down in this work.

MR. EDITOR.—SIR,—Respecting the physiological problem that any person may be suddenly attacked by any great disease whilst in perfect health, I have always insisted, that such is opposed to all physiological laws. The general condition and state of such individual, should always show some previous departure from a true balance of health in the system ; although such person *might* apparently be in his usual good health, and able to perform all the duties of the healthy individual in every way. Still, when we see, as we do, a certain number taking an epidemic, and others entirely escaping ; I hold, that all those who take the disease have what is called ‘ a predisposition,’ which term, vague as it is and so little understood, yet actually amounts to that state I have set forth as a principle—namely ; that in some chemico-vital conditions at present undeveloped by science, there exists a want of balance of certain states and secretions of the body ; and that it may at any time be upset and take on disease from sudden excess ; as well as from sudden decrease, of vital elements.

At the latter part of last year (1865) and beginning of this, I observed neuralgia to be more prevalent than I had seen it for some years at one time ; and that per-

sons in all classes of society, high and low, rich and poor, had it; while, of course, many were exempt. Here, then, is the fact of a departure from that chemico-vital law which makes perfect health; and that any such person might be liable to take other diseases, solely from this fact. I had neuralgia myself at this time; which lasted off and on for nearly two months. It was the only thing I had to complain of: it never interrupted my professional pursuits, nor my eating and drinking or general habit of body; for in every other particular I considered myself in tolerable health. Nevertheless, here was evidently a departure from a true balance of health. Again, about March this year; I had many cases of a singular tracheal congestive cough, more prevalent among adults and middle-aged persons. I had it myself for two months, and so like a chronic whooping-cough was it, that I designated my own to be nothing more nor less than that disease. The expectoration was enormous; and the noise in the inspiration while coughing, resembled the whoop. Indeed, several medical men who had had cases of this kind under their care, called upon me to ask my opinion on it; as they could not find any disease of the lungs themselves. On comparing notes they agreed with me, that this singular attack, which appeared so general, was nothing more nor less than tracheal congestion, and resembled chronic whooping-cough. This congestive action, and consequent irritation, seemed to extend from the chordæ vocales to two-thirds down the trachea; but not reaching to the bifurcation. The adults who had it, having power to expectorate freely, did so.

The treatment I adopted and recommended consisted of generous living, with expectorants and counter irri-

tants and plenty of fresh air ; which seemed to keep it under control, but not to reduce it entirely under two months. This was about the time my own attack lasted; yet in every other respect I had fair health. Some of my own patients had already compared their attacks to the same cause, from the similitude of their coughs to those of some of the younger members of their families, who had had whooping-cough.

Now these two prevalent diseases, I mention by the way, to draw the attention of my medical brethren to them, should they have seen them, and yet not noticed their singular epidemic character : as well as to lead me up to the first observation, that my system was evidently out of a chemico-vital balance of health, and was prepared from such *predisposition*, to the attack of which I am now about to speak.

On June 5 last, in the midst of what I may call my usual health, I felt, towards the middle of the day, great lassitude and debility, attended with curious aching pains throughout the whole body, and by the time I usually leave my town residence for the country, I felt unusually ill; so hastened home as quickly as possible. By this time I was thoroughly subdued, and went to bed, suffering with alternate rigors and intense painfully cold sweatings; and then bursting into fiery heats. The peculiar sensations of patients, I think, for the sake of physiology, should be recorded; as they often illustrate how much altered bodily secretions affect the mind; by those laws of matter which act within it, and show that there can be no vital aura or principle independent of those secretions. For myself, I seemed to lose all identity, and believed myself a mere nebulous mass; and it appeared to me, that a few imps of

darkness, regardless of my fourteen stone weight, had quietly tied me up in a common silk pocket-handkerchief, and by the four corners tossed me into a furnace—a veritable pandemonium. My thirst was unquenchable; my body a burning surface. In this furnace I seemed, for some thirty-six hours, to sink and sink lower and lower; yet I felt to want support and plenty of cold drinks. So I had every two or three hours, from a delicious cold cellar, tumbler after tumbler of porter and strong ale alternately, with draughts from an unparalleled well, whose water is both pure and cold. Cold applications to the body, evaporated as soon as put on.

The third day my friend, Mr. B., was summoned to my bedside—a man second to none in knowledge of every branch of his profession. ‘Well, doctor, I am sorry to see you so ill, but I have always a difficulty when I approach your bedside, knowing your peculiar views as to medicine.’ ‘Well, then, B., leave it alone,’ was my reply; ‘I am taking no end of cold drinks—porter, strong ale, and water; water, strong ale, and porter, alternately, and they seem to do me good.’ ‘Well, if they suit you, and you think it right, go on; but what is this red patch on your cheek? Why, you have erysipelas setting up!’ And true enough it was; and like its name, it ran like wildfire over all the right side, ear, neck, and back of the head. Next day, a corresponding patch came on my left cheek, with even greater virulence, and ran as rapidly over the left ear, neck, and back of the head. Here it seized on old and wonderfully deep cicatrices of my friend B.’s scalpel of eleven years previous, when I had a carbuncle of great magnitude, which sent me *hors de combat* from my

profession for three months. I suffered all the pains of the carbuncle over again, barring the deep and ghastly incisions. The erysipelas extended to my back and shoulders; and altogether I suffered the torments of the condemned. There was nothing round and about me that I took cognisance of. All I seemed to know or to think about, was the physiology of my disease; and after I got well, I was told of many circumstances I said and did, and what others said and did, of which I was then perfectly unconscious.

Now, as I lay writhing in bed, I wanted to find a cause for these agonising pains. I tried to reason upon them physiologically, and at last came to the conclusion, they were caused by the sudden drying up of all my secretions; and with them, the disturbance of all the chemico-vital actions, as well as the sources from which arise our natural galvanic or electrical powers of life; and also from the constriction of all the circulating vessels; and I don't think my conclusions were wrong; as I will show by-and-by. Goulard's lotion combined with camphor julep, was freely squeezed from linen rags over my head and face, and its cool trickling through the roots of my hair, and down my face and neck, were most delicious. Curious enough my pulse was good, and my appetite such, that I could take meat and nourishing things when fed; but I could not feed myself. On the sixth day, my head and face feeling like the side of a house, were so disfigured, that I should not have been recognisable by my oldest friend. On the seventh day, a new feature set up. I burst into such terrific perspirations that I sopped everything I wore; when immediately a new train of symptoms set in. The horrible racking pains I previously suffered,

now gave place to a different class. All the lakes and springs, rivers and seas, and ponds of the body, returned again; while the pains altered in their character, and I could bear them apparently without moving; whilst the others, from an entirely different physiological reason, caused me to writhe; and as I lay, I often tried to calculate how many different positions and angles of the body and limbs, a patient might make and get into; and how many times he might roll a good old four-poster, six feet square, in an hour. My calculations got to many hundreds. But with these new symptoms came other curious sensations. I could not bear anything cold to drink, while previously I had had nothing but liquids of the coldest character; but now wanted everything hot. And the quantity of boiling hot—but not strong sherry and water—I drank, I must forbear to mention. It appeared as if I could not get enough of it. I felt a sensation, (here the sick man's fancies appear again,) that I had in the upper part of my trachea a great black hole, about an inch wide, and three inches long, and when I drank the hot sherry and water, it seemed to fill it up. Now, curious enough, this had been the seat of my tracheal congestion, or chronic whooping-cough, for two months. The effect on me was, that it warmed and stimulated the anterior and posterior mediastinum, and to have a specific action on all the upper part of the heart.

On the sixth day, my friend B. said, 'How are your bowels?' 'Oh!' I said, 'they are good friends, they are conserved; they have not been opened since my attack.' 'Well, I know you have peculiar views on that subject, but should they not be opened?' 'No;

not till Nature dictates. I want reconstruction.' Physiologists do not yet know the value of the gases generated from fæces, nor the value of the fæces themselves, 'as fæces.' In the evening, however, I had a very black solid motion. 'Oh!' said I, 'here is plenty of carbon; all the burnt up and charred materials, after Nature had extracted from them their precious gases.' This mass was perfectly *inodorous*.

Next day I had a similar motion; and the following, a natural solid one in colour and consistence, with a proper feculent odour, and every day since, one of the same character. On the ninth day; desquamation of the erysipelas came rapidly on; and I could bear no longer the cold applications; so I applied starch powder to all the parts. My pains gradually subsided; excepting that I lay with difficulty on the back of my head, while the great bunches of red and purple spots on my shoulders and back, pained me much. Desquamation of my face was most rapid. I had been fed on beautiful lamb and mutton chops, egged and bread-crumbed, and plenty of hot sherry and water. Now, I could compare the desquamation of my face, ears, &c., to nothing but one of these egg-and-bread-crumbed chops, when cold. Directly you cut them, the mass of egg and bread crumbs comes off, leaving the chop bare. So the desquamation of my erysipelas. All came off, and left my face as clear and rosy as it had been before; and no one would have believed I had had such an attack.

On the eleventh day I got up for a few hours. On the twelfth day (Sunday) I got up and shaved for the first time. This was a terrible operation: but I found the skin beneath well healed. On the thirteenth day

I was up all day ; and on Tuesday, the day fortnight of my attack, I came to town to follow my usual consulting practice ; but, feeling dreadfully weak.

Now come the important points to be considered. I took no medicine of any kind from the beginning to the end of the disease, excepting a dose of morphia, which could not be repeated. My friend B. suggested a little acid and quinine the last five days, which were very grateful. The art and mystery of medicine, can therefore claim no credit in the case. The homœopaths might step in and say, ‘you did nothing ;’ but where is the humbug of their globules to credit them with anything ? Well, then, there is nothing left but the *vis medicatrix Naturæ* and common sense, to fall back upon for explanation ; and in the former we must look somewhat to a knowledge of physiology. In the first place ; there was a rapid wasting and a house in a blaze,—water quenched the fire to some extent : but the porter and ale supplied that part of the fabric which was being rapidly consumed. For I have observed this great physiological law—namely, that nature never has a consuming or exhaustive disease, even from its first onset ; but that she immediately, by the *vis à tergo* of her chemico-vital powers, begins to repair from her bases of operations ; and both actions will go on at the same time. That I have for many years been of opinion, that we do not understand fevers and great inflammatory actions, inasmuch as we keep them too low : and do not properly assist the principles of organic life, in reconstruction. Next, as I have always said in my physiological writings ; man is an acid generator, and everything he takes in the shape of raw material or diet, barring the direct acids, are alkaline or highly

alkaloid. Stimulants and diet in my case, were all the medicines I wanted. The fire burning up all stray material, was first subdued by cold ; while the structure was not allowed to be over-consumed, because the mere act of absorption of fluids through porous structure increases temperature ; and it would not have been at all consistent, for a certain temperature to be suddenly reduced. For if that once takes place, the power of reconstruction of elements is taken away ; so that, as fast as structure was burnt up in one sense of the word ; a reconstruction of material took place ; which was, no doubt, assisted by the porter and ale.

Then, again, the uses of the fæces were most important, to supply the vital gases to the body. If salines or aperients had been taken, these would have been swept away. In thus retaining the fæces to get all their hydrogen, my system was free to use the oxygen so largely supplied in my drinks. But if the fæces had been removed, and no hydrogen formed ; the oxygen would have soon worn out all the structures ; and I must have succumbed. Here, then, is a great field for the consideration of the physiologist ; which I have endeavoured to force on his notice ; and he who should stand by the bedside as the *opiferaque per orbem dicor*, and in such cases give cathartics, is, alas, the great destroyer of his species, through obedience to the falsest dogmas which ever gained belief ; and he, unknowingly, and through utter ignorance of the principles of life and physiology ; sweeps away the very elements which Nature herself designs to uphold---structure. The conservatism of the colon, and making use of the fæces as the agriculturist makes use of his manure ; was the great act which led to the upholding of all

the natural powers; assisting them in every possible way, to supply the deficiency of what was burnt up and destroyed.

Those who have read my letters on physiology, and may now read this case, will see, that I followed, in one of the severest illnesses that can attack the human frame, the very principles I there laid down; for it was marvellous to all who saw me; my friend B., my brother, Dr. —, my brother-in-law, Dr. —, and others; that in one fortnight, I rushed into a life-destroying fever and erysipelas; and came out of it without a functional disturbance. Great, nay excessive, weakness and debility was all the trace left behind.

Now, there is one more fact to be noticed here, and it may be of great value. My brother, Dr. —, reasoning in this way, said:—‘Now, you, in your sixtieth year, must be very careful. Have an easy carriage to go to your town residence for a few hours a day, and be brought back in the afternoon.’ Here, again, there is a great want of knowledge of physiology. To get into a stuffed coach, with springs so easy, that you may imagine you are not out of your own arm-chair; has a tendency to produce apoplexy and gout; and if you close the windows,—suffocation. ‘No, no,’ was my reply. ‘I shall have my short sharp ride by rail; then I shall get into one of those delicious old London four-wheeled cabs, and have my secretions shaken into their proper places, and get exercise into the bargain; which I cannot take in any other way; for I am too weak; and if I am obliged to shut the windows, I shall still have plenty of air. This I shall do night and morning.’ On the day fortnight of my attack I did this, and have been at my post every day

since. On the third day after I was out, I had a telegram to go into Kent. I started early, and from one station to the other, got my jolting ride in a cab, and then into Kent, and back again to my practice. And let me say this; that when a man of sixty has had such an attack as I had, and once gives up to laziness; and unnecessarily makes himself more an invalid than the nature of the disease has already done; instead of rousing himself on the truest principles; he begins at once to shorten his life.

LONDON: *June 18, 1866.*

CASE OF DEATH FROM POISONOUS GASES, GENERATED
IN THE BODY, FROM DECOMPOSITION OF ORGANIC
STRUCTURES MADE WITHIN IT.

SIR,—Now that the apparently mysterious death of the young Frenchwoman at St. John's Wood is decided by a coroner's jury, and no one implicated in a criminal act; I hope you will allow me a few words on the verdict:—‘Died from abortion, but how brought on there was not sufficient evidence to prove.’ ‘Died from abortion’ is perfectly correct; but to the mind of the physiologist there is ample evidence, in the absence of all criminality, for the death. The whole body is one porous mass; it makes its own secretions and gases, which it both exhales and absorbs to a large extent. So that, on the one hand, the body may, as it does in many epidemics, make its own poisons, which are, in fact, the fuel for the spark; and is that which constitutes the vague term ‘*predisposition.*’ This is the

reason why, in an epidemic of any kind, some take it and recover and some die ; whilst others are not affected by it at all, though living in the same locality and amidst it ; simply because no spark of contagion or infection can find fuel in them to cause disease. Now, Sir, in certain conditions of the uterine organs, I have elsewhere proved, that the dead ovum may remain *in utero* during the whole period of female gestation, and not become putrid ; *ergo*, there are no decaying or decomposing vital elements. This ovum, caused first by conception, has been deprived by some natural act of its germ, or what would have been a fœtus, or a child ; becomes an inorganic mass, and may grow and grow, and at last cease to have vitality ; and yet remain without let or hindrance to the parent. Now, mark the converse ; a parent may have, like the deceased French girl, a fœtus four or five months old ; and by an accident or fall this fœtus may die. It does not follow that Nature gets rid of it directly, though she is too wise to retain it long ; for, being a vital and highly organic mass, it becomes decomposed or putrid if it remains long enough ; and the natural powers do not, from some inscrutable cause, expel it. The poisonous gases which emanate from this mass, are of such deadly virulence to the blood and general secretions, as well as to the other gases abounding throughout the body ; that they poison them as insidiously, as anything given of the same character, wilfully. Now, I will give you a case in point in as few words as possible. Some twenty years ago, a lady sent for her accoucheur at her full time ; and she laboured for many hours. At last all pains left, and, the accoucheur, thinking that it was a false alarm, left also. He called next day—the

lady was up and about—and the next day too. Well, the natural inference was, ‘Send for me when I am wanted.’ About a week afterwards she showed symptoms of being very ill, and I was called in. The general fœtor in the room, and the first examination, conveyed to me the knowledge of a dead child. I lost no time in relieving her of it; but what was the result? The child proved to have been dead some days, was in a very putrescent state, and remaining *in utero*, precisely the same as that of the young Frenchwoman; she was poisoned by the absorbed gases of her dead child. The difference of the circumstances being these:—that, whereas, in my case the lady had gone the full term of utero-gestation; consequently a larger mass was decomposing, and thinner walls presenting themselves everywhere, for the poison to permeate. She died in thirty-six hours after delivery, from this cause. The evidence at the above inquest showed a fœtus in a state of putrefaction of some days’ standing. Now, a four months’ gestation, left thicker uterine walls and surroundings, and, therefore, greater power of resistance to the gaseous poisons. Death consequently was slower. The fall on board the steamer, and the great sickness on the voyage, was sufficient to destroy fœtal life itself; all the rest is natural enough.

LONDON, *July* 29, 1865.

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